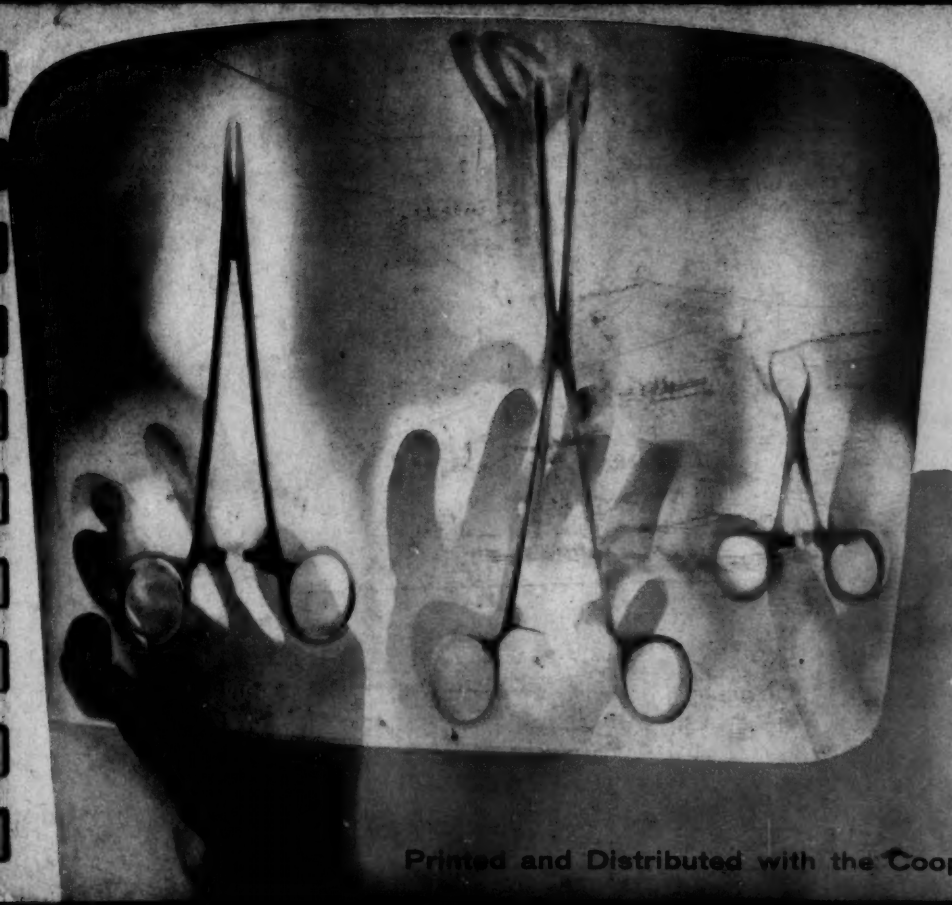

THE OR YEARBOOK from HOSPITAL TOPICS

VOLUME FIVE

1954

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Foreword

It is with a great deal of pleasure that we of HOSPITAL TOPICS present this, the fifth volume of the O.R. Yearbook. As did the previous Yearbooks, this volume brings together in a permanent reference form, the important material published in the O.R. Section during the past year.

Editorial matter presented in the O.R. Section is independently selected and prepared by the HOSPITAL TOPICS' staff. The guidance of Carl W. Walter, M.D., and Dorothy Wysocki, R.N., both of the surgical staff of Peter Bent Brigham Hospital, Boston, is gratefully acknowledged.

Ethicon, Inc. financially sponsors the O.R. Section and each year sends individual gift subscriptions to over six thousand operating room nurses.

Gordon W. Marshall

Publisher

the O R

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Seven Steps to Supervisory Control

John King Bruun, Chicago
Management Consultant in Industrial Relations

● As supervisors, many of our most aggravating and difficult problems arise in the field of human relations. We must deal with the subordinate who, in spite of many excellent qualifications, fails to meet the requirements of a specific job; we are confronted with a likable person who spends endless hours "chatting" on the phone to the annoyance and inconvenience of fellow workers; we are confronted with a difficult decision when a loyal employee becomes involved in a legal or emotional problem which begins to interfere with his job.

Sometimes the problem centers around the poorly trained or perhaps dishonest subordinate who wastes or steals materials and equipment. Another situation may be concerned with health and safety. Obviously the human relations problems could be multiplied indefinitely, and it is their number and complexity which arouses our present concern.

In speaking of supervisory control it is my intention to underscore the word *control* in the belief that this switch in emphasis will more swiftly carry us to the heart of the problem.

For *supervision* has come to mean to many people simply the directing of activities of others. But when we speak of *control* we mean directing to a predetermined goal with the skill, confidence, and knowledge essential to achieve our purpose.

When we listen to the music of a great symphony orchestra, the difference between mere harmony and a soul-stirring rendition lies in the *control* the maestro has over every element involved. And the control which the skilled surgeon has over the outcome of an operation is likewise based on skill, confidence, and knowledge.

If you will think of a supervisor as being in *control*, it is possible that the program I am going to suggest will be more meaningful. The thought of "good supervision" or "bad supervision" may be so general as to leave you indifferent. But it is hard to be indifferent to one's own situation thought of in terms of "under control" or "out of control." How can we as supervisors bring our own problems under control? What steps must we take?

Most certainly, the first step is personal professional development. Your own attendance at this conference is indication that you appreciate the significance of this. An exchange of ideas and experiences with others provides a yardstick against which we can measure our practices and our progress.

It is difficult to overemphasize the importance of continual self-improvement. It is not only that new technics

Mr. Bruun answers questions of Mrs. Melvin Blakeman, R.N. (l.), associate director of nursing, and Irene Burgess, O.R.S., both from Good Samaritan Hospital, Lexington, Ky., following presentation of his paper at the International College of Surgeons meeting.

and ideas are constantly being developed; more important is the open mind and the depth and broadness of understanding which identifies the real leader.

It seems to me that the most positive people I know are those who long ago closed their minds to anything new. Sometimes such people either through birth, accident, or seniority hold responsible supervisory positions, but those beneath them live in a world of fear where creative thinking dies aborning.

Our control of others is so much easier when we have their respect. Improving ourselves is one of the surest ways to gain respect—and I put this first on my list because unless you are willing to improve and develop yourself nothing that I say will have any value for you.

The second step in your program for greater control is to plan and organize with a clearly defined goal or purpose in mind. You must become a good administrator with all that this term implies. If your goal is *the welfare of the patient with due consideration for the standing and reputation of the hospital, the surgical staff, and yourself*, then all you do must lead to the accomplishment of your goal. You must organize. You must coordinate. You must manage.

Consider, if you will, a few of your responsibilities.

(1) You must know the policies and objectives of your hospital. Seek them out if those above you have failed to communicate them satisfactorily.

(2) Then explain and discuss these policies with your subordinates in a way that will win their loyalty and respect.

(3) Draw up definite lines of responsibility and authority so that those to whom you delegate work will understand what is expected.

(4) Make sure that when instructions are given they follow a pattern of good organizational procedure.

(5) Cooperate with other supervisors at all levels.

(6) Assign and distribute the work fairly, with adequate notification to individuals who must adjust their personal affairs to meet your requirements.

(7) Be approachable—let the avenues of communications remain open.

(8) Plan, look ahead—and *act!* Positive, well-thought-out action always wins respect.

(9) Be conscious of costs and be open to suggestions for improvements.

(10) Maintain simple but adequate controls.

(11) Have standards of performance and accomplishment, and rate your subordinates so that they understand what is expected and how they are doing.

I might add to this list the duties of the administrator, but there is enough here to suggest that only the conscientious supervisor will ever be really in control. The indifferent supervisor who ignores even one of those eleven responsibilities is opening the door to trouble.

THE VALUE OF COST CONTROL

The third step might well have been included and developed above, but it is of sufficient importance to give it stature of its own. Step three is an understanding of budgeting and cost control.

In industry we have learned that the foremen who are most concerned with costs are doing the best job on everything.

If you will think of that for a moment you will see that

it is not at all strange. For if a supervisor is cost conscious, he will be concerned with the problems of proper maintenance, ordering new equipment, training of workers, and avoiding waste, duplication of effort, spoilage, tardiness, absenteeism and improper utilization of time.

The budget is a fundamental tool of good management. It provides a goal and standards against which performance may be measured. It is a device to tell you if your controls are working!

The fourth step is the development of an understanding of workers as members of a group. It is important to understand group sentiments and reactions, and to channel group energy into constructive achievement.

Help your subordinates to develop a feeling of belonging and through consultative supervision bring them into participation in such things as planning, scheduling and discipline.

Remember that many people hold a long-standing suspicion of anything management may suggest. Groups tend to band together to combat things which interfere with job security, status, personal interests and group stability. To control groups, you must understand something of the psychology of groups.

The fifth step, developing an understanding of workers as individuals, might well be summarized by a statement attributed to John D. Rockefeller. "Good management," he said, "consists in showing *average* people how to do the work of *superior* people."

Since you are working with average people it is important to understand how they are alike and how they differ—and it is the individual differences which it is vital to understand. Someone has said that one of the great mysteries of the universe is that in all nature there are no duplicates. No two snowflakes, no two leaves, no two fingerprints are exactly the same.

In dealing with people remember that each wants to be recognized for the individual he is. Psychologists tell us that desire for recognition is one of the strongest drives in human nature. And they tell us there is a tremendous loneliness experienced even by those—perhaps particularly by those—in high places.

This may very well be the key to successful human relations. Give fitting recognition to subordinates as well as to superiors. Recognize work well done with appropriate commendation, and where we have discipline to administer for faulty performance, let it be fair, consistent, and certain.

More important, however, is the effect on the subordinates. It is unfair to them to have a variety of bosses and this situation very speedily undermines morale. Sometimes in acting your role of buffer you are demonstrating a loyalty to your charges which is repaid a hundred-fold in loyalty returned. It is not that you will protect them from justified criticism. It is simply that you, yourself, will handle the discipline more effectively, with the fairness, consistency, and certainty already referred to.

I shall only mention the sixth step in achieving control, for others at this convention are dealing with it effectively and at length. It is developing the ability and willingness to teach.

It is here you analyze the specific training needs of your division and develop a program for newcomers as well as for those at various stages of learning and development. You must not only know what to teach, you

must learn how to teach, since the control of individuals presupposes a command of the methods of communication; and teaching, as I think we will all admit, uses technics of communication, varied yet specialized, which must be learned by dint of study and experience. There may be born teachers, but most have to work at it—hard.

"But they told me this operation was going to be televised!"

From the "Nellie Nifty, R.N., Cartoon Album" by Katz. Available from the Horizon Printing Co., New York for one dollar.

AN ALL-IMPORTANT WORD

The seventh step gives life and meaning to all that has gone before. It is a single, all-important word—inspire.

Without this you are building on a foundation of sand that may be eaten away by the tumbling of restless waves. For there will be waves of other jobs to tempt your workers; there will be the call of more regular hours and less arduous duties; there will be waves of materialism expressed in a "so what's the difference" attitude. Against that ceaseless pounding you must build your defenses.

We, in industry, know the importance of inspiring. It has been said that the most important duty of the executive is to develop morale, for out of a proper emotional readiness will come performance at the highest level. Yet what have we, in the last analysis, to offer? Only that we all pitch in to make a profit! Oh, it's a worthy enough motive and there is great economic justification for it, but how insignificant in comparison with the motive held by those of you who have dedicated yourselves to minister to those ill of mind and body.

If those who work for you are truly working with you because you have inspired them with the worth of their calling, your problems of control become fewer and less aggravating. Your rules and regulations exist for only one reason—the welfare of the patient. Your disciplines are exacting only because human lives are entrusted to you and the responsibility is great.

The other steps I have given to you will make you technically proficient. The seventh step can make you what I am sure hospitals, as well as government, business and industry need—a true leader.

*Is O.R. Experience Necessary?**

By Marie H. G. Charlier, R.N., Ph.D.
Rutgers University, New Brunswick, N. J.

● One has only to compare the nursing curriculum of today with that of twenty-five years ago to know that nursing education has taken tremendous strides in preparing students for the practice of nursing. Yet the trend in nursing education to decry the value of the surgical nursing experience in the student nurse's basic curriculum should be critically reflected upon before it gains momentum. Already, some schools experimenting with curriculum changes have shortened or eliminated the student nurse's traditional experience in the surgical theater.

What motivates this change in educators' attitudes toward surgical nursing?

The idea was first advanced that the student's time in surgery was of little or no significance since it did not cover an adequate amount of surgical work. Actually, this reputedly "inadequate amount of work and time" consisted of two months, during which the student nurse had to assist in 25 major surgical cases and 50 minor cases. Furthermore, the proponents of the change argue that the student's apprenticeship in surgery unnecessarily and unwarrantedly taxed the energy and patience of the surgical teams. Many students, it was asserted, "were fearful of the 'holier than thou' attitude fostered in surgical groups." However, one of the main arguments for the elimination of this experience is that surgical nursing is a specialty which can be learned, if necessary, or if desired, after graduation.

AGAINST SHORTENING O.R. WORK

Having served as a surgical supervisor for a number of years in general hospitals—both civilian and military—I am adamant against the shortening or elimination of the student's assignment to surgery. After painstakingly weighing the pros and cons, there is no doubt in my mind that the general adoption of this curriculum change would be a most unfortunate development for nursing and this country.

The elimination of this phase of the nurse's education would necessarily deny us the opportunity of detecting and encouraging potential operating room nursing personnel. Without the inclusion of O.R. nursing in the curriculum, how could we discover within the student body skills and aptitudes that characterize the neophyte surgical nurse? If we are dependent upon the development of interest after graduation, could not the lack of O.R. experience tend to give the student and graduate a psychological block when they consider O.R. nursing as a specialty? Those who have tried to recruit nurses for TB,

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psychiatric, and polio nursing can testify to the psychological block encountered here—and this is basically because of fear grown out of a lack of knowledge of the specialty.

I maintain that students need surgical assignment for these additional reasons:

- They should understand the "why" of the special care required for different surgical patients.
- The two months of intensive work and association with operating room personnel does encourage informal talks on the "cases of the day" and thereby advances the knowledge of the student.
- The student nurse will by demonstrations and exercises learn lessons in surgical asepsis that no other hospital assignment could teach as clearly. The value of learning while actually performing cannot be denied.
- In addition to assimilating the principles of surgical asepsis, the student will receive lessons in applied anatomy and physiology. From these lessons the student should develop a respect for the body and the body tissues.
- Finally, these studies in the surgical theater give the students an insight into their own capabilities and interest, help them in future work, and may arouse in them an unsuspected aptitude for surgical nursing.

SURGICAL STAFF NEEDS PATIENCE

Naturally, the presence of students in the operating amphitheater does require patience on the part of the surgical staff, but the same amount of patience would be called for when postgraduates or non-nurse technicians without any experience in the surgery are introduced into the O.R. To protect the patient and the staff, I believe that no student should be required to carry out completely the responsibility of a surgical technician. At all times there should be a graduate nurse supervisor present. The graduate should fulfill the role of first surgical nurse, while the student nurse should be her second—assisting and being assisted, but not eliminated.

The teaching and education committees and staffs in institutions concerned with nursing education always stress the point that nurses perform repetitious duties that do not require skill. That is why, they say, there is a need for medical technicians (who are not R.N.'s), such as nurses' aides, practical nurses, and attendants, to eliminate the expense this needless waste of skilled personnel entails.

Starting from this premise, then why is it not recommended by our experimentally-minded educators that the period of surgical training be extended rather than eliminated? Would not this give the student ample time to acquire surgical skills, and as a result be prepared to perform delicate and specialized tasks that are non-repetitious and truly professional in nature?

If the complete elimination of the surgical experience does come to pass, it must be borne in mind that interested graduate nurses will have to go back to school and invest in a six to 12-months' postgraduate course to decide whether or not they will enter the surgical field; disinterested graduate nurses will be willing to leave the specialty to nonprofessional technicians. Is this a future to look forward to in a country that at any moment could desperately need the surgical knowledge and skills of every available surviving nurse?

Question Box

Each month questions pertaining to O. R. problems and technics will be answered by Dr. Carl W. Walter, nationally known for his operating room technic courses and as the author of "Aseptic Treatment of Wounds" (MacMillan). Questions should be addressed care of the O. R. Editor, Hospital Topics.

***Q.** How often is it necessary to re-autoclave sterile supplies when they are wrapped in double thickness muslin wrappers? I have heard various opinions. Some hospitals re-autoclave sterile supplies every eight days, every two weeks, or once a month. I would like to know your opinion.*

A. Supplies which are properly packaged and wrapped, and stored in a clean, dry, vermin-free place, need not be resterilized. Such a practice is a waste of time and results in early deterioration of linen and equipment.

***Q.** We are interested in buying some aluminum equipment and should like to have your opinion as to its conductivity.*

Also, how well are needles sterilized in the anchor spring needle holders in an autoclave? If they are in the needle holder, tight between the springs, isn't the same principle involved as having hemostats closed when sterilizing? Also, you said stainless steel wire might be sterilized on the spool, but isn't this also the same as having hemostats closed during sterilization?

A. Specifications for furniture for operating room use can be found on pages 21 and 30 of *Bulletin 56 of the National Fire Protection Assn.* This booklet can be obtained for 25 cents from the association's office at 60 Batterymarch Street, Boston 10, Mass.

Needles can be sterilized in an anchor spring holder because there is not the tight apposition which is the problem in sterilizing a locked hemostat.

I do not believe that stainless steel wire is wrapped tightly enough on a spool to interfere with sterilization. I do think, however, that stainless steel suture material is better sterilized in pre-cut lengths or wrapped around a metal reel to prevent kinking.

Q. I understand one of the girls coming back from one of your courses recommended the technic of using a 10cc or 20cc syringe, just exchanging the needles, and giving penicillin to more than one patient.

We have always frowned on this but she insists that you recommended this as a safe technic. We are interested to know whether you did or if this is a misunderstanding.

A. I have always firmly maintained that every patient has a right to sterile, individually packaged supplies, syringes, needles, etc. I even feel that the multiple dose vial is dangerous.

Q. We are using an aqueous Zephiran solution 1:1000 for chemical sterilization. We mix our own solution, and I am concerned as to whether or not our method is correct in your opinion.

At present, we are mixing the concentrated Zephiran solution with unsterile distilled water in the correct amount to make a 1:1000 solution. Is it necessary to isolate this solution for 18 hours before it can be used as a germicide?

A. The 18-hour isolation period for germicidal action to disinfect the container and the distilled water is current practice.

Q. A controversy has arisen among our staff concerning the sponge count. It is taken in all laparotomies, but some of the staff insist that it be taken on thyroids, hip cases, and open reductions. Another point on which we cannot agree is the number of times during a case, the count should be taken. Will you please advise us?

A. I personally do not feel that a sponge count is necessary. The scrub nurse by limiting the number of sponges on the field at one time and substituting a clean sponge for a used sponge provides safety in this area. The surgeon cooperates by telling the nurse when he has packed a sponge in the wound. Whenever possible, sponges or packs which are tucked into the wound have a clamp fastened to one end.

The question of when and how often to do sponge counts should be taken up with your technic committee or surgical staff.

Q. We should like to know your opinion on the following questions:

1. Should dirty cases be scheduled and done after all clean cases (we have only one operating room) or may cases be intermingled?

2. Is the incidence of infection in clean cases which follow dirty cases greater than the general incidence of infection?

3. What lapse of time is optimum for doing clean surgery after dirty surgery?

4. How extensive a cleanup is required after a dirty case? Must walls be scrubbed—if so, how high? Should operating lamps be scrubbed?

A. You will find the complete detailed philosophy of treatment of dirty cases described in Chapter 15 of *Aseptic Treatment of Wounds*. There also is a movie available depicting the technic in detail.

To answer your specific questions:

1. Dirty cases are scheduled indiscriminately with clean

cases, suiting the convenience of the staff.

2. The incidence of infection in clean cases which follow dirty cases is no greater than the general incidence of infection when the instruments, textiles, and floors are properly cared for.

3. The operating room is much safer immediately after a septic case than after a quarantined period for the simple reason that blood and pus containing dangerous organisms are still moist and the organisms remain on the floor and furniture. After several hours these vehicles dry and the bacteria are scuffed into the air.

4. The walls need not be scrubbed unless blood or pus has actually squirted or splashed on the walls. The only areas which need to be disinfected are the floor, the operating room table, and the instruments. The extent of the problem depends solely upon how competent the surgeon is in limiting the extent of contaminated areas. If he uses a sucker, passes the suture ends to the nurse, and controls the pathologic specimen, a relatively small area is contaminated and presents no problem. As you can see from the movie (movie of this technic is available through Wilmot Castle Co., Rochester, N. Y.), it takes only 15 or 20 minutes to clean up an extensively contaminated room for safe use.

Q. Our operating room suite consists of six major rooms and two minor rooms. We do 650 to 700 operations per month. We are having a serious problem of lint collecting in the rooms during the day—thus creating a problem in sterile technic. Is there any rinse which we can have our laundry use on the linens which will cut down on the dust and the lint?

Another difficulty is that of getting the hands of surgeons and others powdered in such a manner that the powder does not get on the sterile tables. Do you know how other hospitals have handled this problem? Is there anything that can be put in the powder to keep it from flying?

A. Lint and dust from bed linen are controlled by treatment of the linens with a dust laying emulsion which is added to the final rinse after laundering. The technic is described on page 192 of *Aseptic Treatment of Wounds*. There are also additional references listed on that page.

The problem of controlling dust from glove powder is a matter of educating surgeons and nurses to use care and discretion when powdering their hands. This should be done without flourish over a kick pail to avoid spattering sterile supplies with dust. The amount of powder sterilized with a pair of gloves should be strictly limited to one gram. This technic is described on pages 156 and 157 of the monograph.

Q. Should any nylon garments be permitted in the operating room?

A. Nylon garments which contact the skin throughout their extent are safe in the operating room because static electricity created by motion is neutralized and cannot build up on the nylon since it escapes via the skin. For this reason nylon stockings may be worn. Slips are dangerous in that the static can escape from the upper portion which contacts the skin but it cannot escape from the free hanging skirt. Nylon dresses, of course, are completely insulated from the skin and are very dangerous.

The O.R. Problem Clinic

by EDITH DEE HALL, R.N.

Methodist Hospital Students Spend Six Weeks in O.R.

● To partially fulfill the numerous requests we have had for teaching outlines, we have asked the Methodist Hospital, Brooklyn, for permission to publish the teaching outline used in its school of nursing. The material was submitted by Patricia Connor, O.R. supervisor, and Mrs. Rose Harty, O.R. instructor.

The 500-bed Methodist Hospital averages about 4,700 operations per year and 50 to 60 emergency operations per month. The operating room staff consists of the supervisor, one assistant, one full-time instructor, 12 registered staff nurses, one aide, and four orderlies. All cleaning is done by two workers from the housekeeping department who are assigned to the operating room from 7 a.m. to 5 p.m.

Central Service is responsible for processing gloves, preparing and autoclaving packs, linen, and other supplies. The operating room aide cleans and cares for instruments and prepares basin sets for autoclaving. Nurses are responsible for weekly supplies such as surgical drains and knife blades.

One class of students ranging from 150 to 200 is accepted each year for a three-year training period. New York state law requires a maximum of eight weeks and a minimum of six weeks experience in the operating

room for student nurses. Methodist recently changed to the six-week program.

Two new students are sent to the operating room every two weeks. The total number in the department at one time is six. Students are on duty from 7:30 a.m. to 4 p.m. During the first two weeks they are given constant attention by the instructor. At the end of two weeks the student goes "on call" with a graduate, after 4 p.m. every sixth day. If the student is called, all the time is made up.

Students are given four weeks' vacation per year and one holiday per month from September until June. Their operating room experience may start any time after the first part of the second year of training.

At Methodist Hospital all employees are on a 40-hour per week schedule. To cover call duty, staff nurses rotate and each day one nurse works from 3 p.m. to 11 p.m. After 11 p.m. she is "on call" until 7 a.m. and is paid $8 whether or not she is called.

FIRST WEEK

First Day:

Orientation tour of O.R.
- Physical set up of O.R.

Lecture—Introduction to Surgery
- Ideal O.R.
- Relationship and co-ordination of other departments with O.R. and vice versa
- Purpose of O.R.
- Importance of co-operation between all people in O.R.—teamwork—O.R. manners and courtesy

Demonstration of operation of equipment in rooms

Return demonstration of equipment

Second Day:

Lecture—Skin preparations

Introduction to Scrub—
- Lecture and demonstration
- Gown and gloves technic
- Observation of operation followed by discussion of observation
- Lecture—Sterilization—Physical
- Demonstration of autoclaves and sterile water tanks

Third Day:

Lecture — Sterilization — Chemical —including a short history of asepsis
- Demonstration in "work room" of wrapping of basins, pitchers, etc., also washing and care of instruments

Return demonstration of above—

Demonstration—
- Contents of Lap Pack and D&C Packs
- Instrument set up for Lap
- Instrument set up for D&C, including names and uses for instruments

Fourth Day:

Circulate for operation with instructor
- Care of specimens
- Information regarding procedure on special medications used during operation
- Discussion — circulating nurse's duties
- Lecture and demonstration of surgical positions and table attachments used for each

Fifth Day:

Scrub for operation with instructor

Discussion—duties of scrub nurse

Lecture and demonstration — suture material and needles

Discussion of first week's activities and problems

SECOND WEEK

Sixth Day:

Scrub with instructor or staff nurse

Demonstration of special equipment—
- Bovie Machine
- Actual Cautery
- Post Cautery
- Von Petz
- Kidde Machine
- Cul-de-scope
- Peritoneoscope
- Dermatone
- Burman Locator

Review—Machine operation

Seventh Day:

Circulate with instructor or head nurse

Lecture—Anesthesia

Lecture—Proctoscopic examination—Instruments and care of instruments

Eighth Day:

Circulate with instructor or head nurse

Review on circulating and scrub nurse duties

Endoscopic examination—instruments and care

Other instruments — names, use, and care, such as:
- Cholecystectomy instruments
- Intestinal instruments
- G.U. instruments
- Chest instruments, etc.

Scrub on T&A

Ninth Day:

2nd scrub with staff nurse for first operation—first scrub for 2nd and 3rd

Review and practice on any weak points

Demonstration of checking of drugs and solutions from pharmacy

Tenth Day:

First scrub for major operation with staff nurse as 2nd scrub

Scrub alone for minor operation

Review and practice on weak points

Lecture—Storage of sterile and non-sterile supplies

Proper restocking of room

THIRD WEEK

Assigned to head nurse in room 11th and 12th days

Scrub or circulate with staff or head nurse

13th, 14th and 15th Days:

Scrub and circulate alone — on gen. surg. cases

Clean and sterilize brushes

Clean and restock rooms

15th Day:

Discussion of problems

Take O.R. call by end of third week

FOURTH WEEK

Assigned to head nurse in room to scrub or circulate

Takes O.R. call in turn

Case study

Able to scrub alone on any gen. surg. case

Review and discussion of problems

FIFTH WEEK

Examination over O.R. technic

Gyn. and gen. surgery

SIXTH WEEK

Ortho. and G.U. surgery

Students regard operating room experience valuable because it aids them in giving total patient care. By gaining a knowledge of surgical procedures they are better able to understand the patient's needs. They also learn the principles of surgical asepsis by actually performing technics rather than by just observing.

Graduate nurses realize that this experience does not enable the student to develop a skill. However, they do believe that by giving the student a well-planned course of instruction and

an opportunity to study the operating room as a whole, the student may be encouraged to take advanced instruction. In the near future, Methodist Hospital plans to offer an opportunity for those who wish to develop this specialty, by giving a three months' senior year program.

PROBLEM CORNER

Q. Planning vacation time seems to be a problem in our operating room. The majority of our staff members prefer vacation time in the summer, and senior members believe they should have first choice. The same problem comes up for legal holidays. No relief is provided, and for this reason there is a limit to the number who can be away at one time. In an effort to be fair to all, we would like suggestions or information as to how this is managed in other hospitals.

A. There seems to be no easy solution to this problem, although it exists in many hospitals. If no relief is provided and consideration must be given to seniority, time of year, school programs, relatives, sickness, and other emergencies, it is most difficult to follow a definite plan unless there are no exceptions and the rule is simple. One hospital uses the method of "drawing slips from the hat," and then individuals may exchange with each other if it is agreeable and the supervisor approves. Another hospital follows the rule of all employees rotating, taking a summer or fall vacation one year and a winter or spring vacation the next. In both instances it is necessary to keep accurate records. As for the holiday time, another problem is created because we often have the "privilege seeker." I have found that giving her the list and letting her contact and arrange holiday time for each member of the staff makes her aware of her own selfishness and the feelings of others. Usually, if all members of the staff are allowed to take part in the planning, they consider each other.

Q. The laundry department of our hospital is being completely renovated and new equipment is being installed. The question of laundry personnel folding linen for the operating room is under discussion. How do other hospitals handle this problem?

A. *This system has been found satisfactory, for it saves time and space in the operating room, and since all sheets, gowns, towels, etc., must be folded before they are autoclaved, there is no argument for doing the job twice if it can be avoided. I feel that the best method I have seen is that in which designated laundry workers have received their instructions from operating room nurses. After such instruction they have a better understanding and a greater interest in the method used.*

Q. To what do you attribute a staff nurse being unwilling to improve or make changes in the operating room?

A. *Lack of interest and sometimes ambition which may be caused by one or a number of things. An effort should be made to find the cause and help her in making adjustments, if possible. The nurse may be unhappy in her position, worried and overtaxed with outside responsibilities, ill, or unfriendly. She may be very grateful for help and guidance.*

Cardiac Arrest

by Egbert H. Fell, M.D., and Eileen Heckel, M.D.

This report on cardiac arrest was given by Eileen Heckel, M.D., staff member, Anesthesia Department, Presbyterian Hospital, Chicago, at the 1954 Tri-State Hospital Assembly held in that city. The paper, prepared by Egbert H. Fell, M.D., F.A.C.S., and Dr. Heckel, follows. Dr. Fell is clinical professor of surgery, University of Illinois College of Medicine, and attending surgeon, Presbyterian and Cook County Hospitals, Chicago.

ON JANUARY 28, 1848, Hannah Greener,[1] a 15-year-old girl, died under chloroform anesthesia during surgery for the removal of a toenail. Alcoholic spirits and water were poured down Hannah Greener's throat that day—probably thereby drowning her—and an attempt was made to bleed her.

Certainly since that day, and probably long before that, cardiac arrest has been a matter of grave concern not only to the surgeon and the surgical team, but to the entire medical and scientific world.

The term "cardiac arrest" has become a catch-all expression. There is no general agreement as to the limitations of the words. However, cardiac arrest is not an incident which is peculiar to surgery. It is one that may occur any place in the hospital—in the examining room, the medical ward, the obstetrical floor—or, for that matter, it may and does occur on the street and in the home. It is, however, those cases which occur in surgery that are of particular interest to you and to me, and, consequently, we shall limit our attention to this group.

When cardiac arrest occurs in a surgical amphitheater, it is a harrowing experience, to say the least, as anyone who has been through one can testify. It is not a problem that we are able to instinctively meet and automatically care for in an effective way, unless we have devoted time and effort to the organization of a program expressly designed to meet this particular emergency.

It is a problem that requires the closest cooperation and perfect teamwork on the part of the operating room personnel, the anesthesiologist and the surgeon. In the first place, it is important to admit that it can happen to you. It is only by knowing what to do, when to do it, and

[1]Beecher, H. K.: Anesthesiology, 2:443, 1941.

on whose shoulders rests the responsibility of getting it done, that the patient is offered a chance of survival.

The time to gain this knowledge is before the emergency arises; and, of course, an animal laboratory is the best place to gain experience and condition our reflexes so that, when calamity strikes, we will be able to react without loss of vital time, and so that everything possible will be done to retrieve a cause that will probably be lost unless we have so trained ourselves. We must realize that time is of the utmost importance. We have only three and one-half minutes in which to offer the patient a chance for complete recovery.

The operating room personnel, the anesthesiologist and the surgeon each play a vital role. Each must be in a position to carry out his or her obligation in an effective cadence, or chaos will surely reign. Let us see how each member of this team can best prepare himself to discharge his responsibilities most effectively; for it is only by careful planning that we will be able to give a good account of ourselves under emergency conditions.

It is the duty of the operating room supervisor to see that the operating room personnel is acquainted with the problem and is rehearsed in its duties and responsibilities. There should be available and ready on demand a sterile thoracotomy setup. The essentials are a scalpel, a rib retractor, three sterile syringes and hypodermic needles. In every department of surgery, there should be an electric defibrillator, and all personnel should know its location. The drugs which should be kept with the thoracotomy setup are adrenalin 1:1000 and 10 percent calcium chloride.

The anesthetist must be thoroughly acquainted with the technic of artificial respiration, maintenance of an absolutely clear airway and the removal of carbon dioxide. The necessary pieces of equipment are a pharyngeal airway, a tank of oxygen with a pressure-reducing valve, a rebreathing bag and a mask.

An endotracheal tube, while not indispensable, gives a great deal of added security and prevents gaseous distention of the stomach which will almost invariably occur when artificial respiration is performed by the mask technic on a patient whose musculature is in a cadaveric state of relaxation. Any well-trained anesthesiologist can insert an endotracheal tube in a matter of seconds.

It is the obligation of every surgeon, irrespective of his specialty, to be thoroughly familiar with the technic of getting into the chest and performing adequate cardiac compression. The chest surgeon naturally has no qualms about opening a chest, but, unfortunately, cardiac arrest is no respecter of persons, and all too often it is the otolaryngologist, the ophthalmologist, the orthopedist, the gynecologist, or the general surgeon who is suddenly confronted with a pulseless, pressureless patient. He has three and one-half minutes in which to restore the patient's oxygen system or be faced with failure or partial failure.

This does not mean that the patient's heart must be functioning under its own power or that the patient must be breathing on his own, but it does mean that within three and one-half minutes he must be propelling oxygenated blood supplied by the anesthetist to the patient's vital centers. Hemmed in by this time limitation, it is just as important to know the things not to do as it is to know the things to do. He must not take time to demonstrate to everyone in the operating room that the patient

is without doubt "200 percent dead," for "anoxia not only stops the machine but wrecks the machinery."

He must not send for another blood pressure cuff or change the one that is on the patient to the other arm. He must not send for an electrocardiograph machine. He must not inject medication intramuscularly, intravenously, or even into the heart through the chest wall. He must not scrub or drape the field. This is all wishful thinking and it is wasting precious minutes.

He must get into the patient's chest and start artificial circulation by effective cardiac compression in order to provide the brain with oxygenated blood within the specified period, for it is the brain which is most sensitive to oxygen want.

INCIDENCE

Is cardiac arrest increasing in frequency? That question cannot be finally answered until more statistics are collected and analyzed. The statistics available vary widely on this subject, and vary from 1:4953[2] anesthetics of all kinds in one report to 1:804[3] procedures. This variation points up to the necessity for a clear definition of the limitations of incidences which should be called cardiac arrest.

However, there are some rather astute observers who are of the opinion the incidence is increasing. The opinion[4] has been expressed that it may occur as often as once in every one thousand surgical procedures.

If it be true that it is increasing, why is it increasing? The answer to this may lie in a number of directions. In the first place, the scope of surgery has broadened. Operations are commonplace today on organs such as the brain, the lungs, and the heart which not too many years ago were considered inviolate.

In the second place, it has been suggested by some that today there is a tendency to administer a multiplicity of depressing drugs and agents to patients both before and during surgery. In the third place, life insurance statistics have shown that life expectancy has increased appreciably in the past two decades. Consequently we are undoubtedly operating on more older patients at a time of life when there are already more pathological changes in their vital organs.

Perhaps, too, we are performing more operations of a serious nature on the very young at a period when their metabolic requirements are high, when their reflexes are more sensitive to the potentiating effect of anoxia, and when the margin of error tolerated is narrower than at a little later period in life. Critical statistical analysis may show that all these factors and perhaps others are contributory.

If it be true that cardiac arrest may occur as often as once in every thousand cases, what do these figures mean to us? They have two implications. In the first place, every busy surgical department may likely be confronted with the situation anywhere from once or twice a year to as many as five or six times a year, depending upon the number and kinds of surgical cases handled (One observer reported having compressed 48 hearts in the last five years). In the second place, Hosler[4] has pointed out that as ten million surgical procedures are performed in this country yearly, there may be as many as ten thousand cardiac arrests—and perhaps even more.

[2]Bonica, J.: Current Researches Anes. and Anal., 31:1, 1952.
[3]Gillispie, N. A.: British J. Anes., 19:1, 1944.
[4]Hosler, A.: Manual of Cardiac Resuscitation, Thomas, 1954.

What is the cause or what are the causes of cardiac arrest? There are unquestionably a multitude of trigger factors occurring singly or in combination which can initiate the chain of events which result in this nerve racking syndrome. Irrespective of the precipitating cause, there is one thing which one can say without fear of contradiction—and that is that the damage is done by the anoxia of the vital centers and tissues. The exact role played by hypercardia has not as yet been too clearly delineated.

It has long been known that oxygen is necessary to maintain life. The organism must not only have oxygen for all of its metabolic processes. It must also rid itself of the waste products of metabolism, of which the elimination of carbon dioxide is of paramount importance. It is convenient to think of the oxygen system of the body as being composed of four components—ventilation, respiration, circulation and tissue utilization.

Now, a breakdown in any one of these component parts will result in the delivery of insufficient oxygen to the vital tissues to maintain their viability. By ventilation, inspired oxygen is transported from the external environment to the alveolar sacs. Some of the factors which may interfere with the delivery of adequate oxygen are:

1. Obstruction in any part of the tracheobronchial tree, as by the falling back of the tongue.

2. The presence of foreign bodies, blood, mucus, or vomitus, or obstruction by tumors.

3. A dimunition of the tidal or minute volume by drugs which depress the medullary centers, as is the case in the overdosage of morphine and certain anesthetic agents, or by the effect of such drugs as curare and curare-like drugs upon the muscles of respiration.

4. The gaseous mixture delivered to the alveoli may not contain enough oxygen to supply the needs of the organism, as may occur when the concentration of the anesthetic agent is too high.

From the alveolar sacs, oxygen passes by a process of diffusion across the alveolar membrane; and this process may be interfered with by the presence of any one of a number of pathological processes, such as fibrosis, edema, pneumonic processes, tuberculosis, etc.

Once across the alveolar barrier, most of the oxygen is picked up by the hemoglobin of the red blood corpuscles and propelled by a central driving force or pump, the heart, through the vast network of arteries, arterioles and capillaries to all the tissues of the body, both vital and expendable. Many things may cause an inadequacy of the circulatory system, such as an insufficient amount of hemoglobin to transport the oxygen as in severe anemia or hemorrhage; or an inadequate blood volume as in shock or hemorrhage.

Decompensation of the heart itself may occur as the result of intrinsic pathology of the myocardium or vascular supply; anoxia of the myocardium; drugs directly affecting the myocardium; the effect of certain anesthetic agents like chloroform, ethyl chloride, cyclopropane, and trichlorethylene in sensitizing the conducting mechanism

to the effect of either endogenous or exogenous epinephrine, thereby precipitating ventricular fibrillation; or by reflex mechanism acting on an anoxic myocardium.

Lastly, the oxygen system will be ineffective if the tissues are unable to use the oxygen which has been brought to them by the circulation. This may occur if the vital tissues have been without oxygen for a period of time which exceeds their viability or beyond the point at which they are able to recover. It may also be caused by drugs, chemicals or anesthetic agents in overdosage.

PREVENTION

This is certainly one instance in which prevention should receive a major attention. The best prevention is careful attention and correction of any of the myriad conditions, such as noted in the preceding paragraphs, which may lead to the delivery of insufficient oxygen to the vital centers. Let us recapitulate just a few of these:

1. A careful evaluation of the physical status of patients before surgery, with the institution of regimes to put them into the best possible physical condition, with emphasis on the cardiovascular and respiratory reserve. Hemoglobin and blood volume deficits as well as electrolytic and endocrine imbalances should be corrected.

2. Elimination of sources of human error where possible by: (a) careful checking of labels on all drugs administered to prevent errors in kind or dosage of drug administered; (b) pin index systems on anesthetic machines to aid in inadvertent administration of wrong gases.

3. Administration of adequate but not depressing doses of premedication.

4. Maintenance of adequate oxygenation of patients during and after surgery by: (a) the avoidance of obstruction and meticulous attention to keeping the airway clear; (b) by adequately ventilating the patient with gas mixtures containing more than basal oxygen; and (c) the removal of carbon dioxide.

5. Keeping anesthetic administration simple.

6. Constant vigil over the cardiovascular and respiratory status of the patient during surgery. The anesthetist who sits with arms folded, gazing into space, is courting disaster.

7. Due care on the part of the surgeon with regard to: (a) length of operation; (b) careful handling of tissues; (c) avoidance of noxious reflexes in cooperation with the anesthesiologist by the judicious use of procaine where indicated.

8. A postoperative recovery room is a good investment as a certain percentage of cardiac arrests occur during the recovery period.

DIAGNOSIS

It is felt by some, a belief in which we concur, that "sudden unwarned" cardiac arrest is a rare occurrence. We do believe that it may be "suddenly noticed." We have watched hearts stop beating in the laboratory and during thoracic surgery. We have yet to see the heart in a well oxygenated animal that was beating at a normal rate, maintaining a normal blood pressure at one instant and not beating the next.

There are usually premonitory signs: a change of heart rate, a change of blood pressure, or a change of color of the blood or skin. Constant vigilance must be maintained in order to detect the appearance of signs which may

mean that difficulty is in the offing. After it occurs, the diagnosis is obvious. There is no pulse, there is no blood pressure, the pupils dilate widely and do not react to light, and there appears a purplish mottling of the skin.

ACTIVE TREATMENT

When it is recognized that there is no pulse and no blood pressure, it is time to act. If the emergency has been prepared for in the way suggested earlier, there will be no confusion. The anesthetist will take charge of the patient's ventilation and administer oxygen under pressure through an open airway; the operating room personnel will immediately produce the thoracotomy setup consisting of the sterile instruments, the drugs that may be required, and the defibrillating machine; the surgeon will without hesitation open the left chest and start cardiac compression, thus restoring circulation and being certain that it is effective by knowing that he is producing a peripheral pulse.

It is only now, after artificial respiration and artificial circulation have been started, that he may consider supplementary measures, such as drugs, and transfusions. When he opens the chest he may find that the heart is in complete standstill, that it is beating so weakly that a peripheral pulse and blood pressure are being produced, or that it is fibrillating. What he does after starting compression will depend upon the state of the heart and its reaction to the compression.

After a few vigorous compressions of the heart, the heart may regain its tone and resume its rhythm and continue under its own power as though nothing had happened—provided the interval of anoxia has not been too long. If the heart doesn't react in this way after a reasonable period of compression, the surgeon may desire to inject a little 1:1000 epinephrine into a chamber of the heart or some calcium chloride to improve the tone of the myocardium. Intravenous or intra-arterial infusions of blood or of a volume expander may be in order.

If the heart is fibrillating, once the circulation has been restored by compression, electrical defibrillation is indicated.

How long should compression be continued? Certainly as long as a pulse and blood pressure are being maintained and the patient appears oxygenated, there is hope that the heart will recover. There are reports of complete recovery after several hours of artificial respiration and circulation.

PROGNOSIS

Having met all the requirements, what are the chances of success?

That not all patients can be saved is evidenced by the fact that not every heart can be made to start and continue under its own power, even when cardiac arrest occurs during thoracic surgery when the chest is already open and the airway already under control.

However, the number of patients that are saved, even with our known error and human shortcomings, make it mandatory that we exert every effort toward preparation and training of personnel in order that if the occasion arises—which we hope it will not—the patient will be given the full benefit of present-day knowledge. Universal application of principles and technics outlined will result in a very satisfying improvement in the salvage rate of these otherwise doomed patients.

CONGRATULATIONS to the local convention committee, Association of Operating Room Nurses of New York, whose hard work was responsible for the success of the First National Conference of the Association of Operating Room Nurses. Here program chairman Edith Dee Hall, R.N. (center), and committee members take time for a little relaxation during the busy meeting. L. to r.: Helen Nolan, R.N., co-chairman, hospitality committee; Mrs. Joan Driscoll, R.N., chairman, hospitality committee; Mrs. Anne Sasse, R.N., chairman, entertainment committee; Beatrice Sheahan, special assistant to the program chairman; Ruby Tomlinson, R.N., co-chairman, scientific exhibits; Barbara Volpe, R.N., chairman, scientific exhibits; Carrie Marshall, R.N., chairman, local arrangements committee; and Frances Reeser, R.N., chairman, demonstration committee. Not shown are Rose Wabersich, R.N., co-chairman, local arrangements committee, and Rose McGuire, R.N., co-chairman, demonstration committee.

First National Conference

A.O.R.N. Delegates Form National Planning Committee

THE big news to come out of the first national conference of the Association of Operating Room Nurses, held at the Hotel New Yorker, New York City, February 1-3, 1954, was the formation of a National Planning Conference Committee to plan and organize the second annual national Conference.

The nearly 1,800 nurses who attended the conference voted unanimously for a second meeting. Action on this vote was taken by delegates from A.O.R.N. groups and prospective groups who attended a special dinner session. It was decided that although there was as yet no national organization of the A.O.R.N., annual conferences would continue to be held under the auspices of a national conference planning committee. It was further decided that a secretary to the committee be appointed to coordinate its work. The selectee was Edith Dee Hall, R.N. Miss Hall appointed a chairman of finances and an advisory council.

The enthusiasm which this first conference received was revealed early the first morning. Lines of nurses formed from the registration desk on the second floor, down the steps to overflow into the hotel lobby. When the first session opened, every one of the 1,200 seats in the Grand Ballroom was taken and nurses stood in the aisles and in the balcony. Dr. Paul K. Sauer opened the meeting to an attentive audience. Interest and attendance remained high throughout the conference as was evidenced by an occurrence during the problem clinic on the last afternoon. When moderator Margaret Giffin offered a three to five-minute break, the response was "No, just one minute."

The Surgeon and the Operating Room Nurse

Paul K. Sauer, M.D., Chief of Surgical Service, Bronx VA Hospital, New York City

● An opening address is by tradition an expression of welcome. On this occasion, however, if I were to confine my words to those of welcome my conscience would tell me that I had transgressed against opportunity in not recognizing this occasion for what it is.

One of the most absorbing experiences in life is the birth of a lovely child. Conceived through love, borne with pride, and delivered with expectation, the child is the representative of progress and the ambassador of hope. To be present at this birth is a heart-warming experience; to be invited to feel the pulse and evaluate the condition of the offspring, is a source of very great personal pride.

It is on occasions such as this that one recognizes the great system and order about us, and that the individual can be only an observer, or at least a contributor, according to whether he chooses to live his life passively or actively. Those of us who work within the field of medicine and surgery feel that we are living an active type of role in life, working among others of similar philosophy, each of us trying to contribute his share.

You have known for some time that there is room for much progress within your branch of our common endeavor. You knew that first as individuals, then as groups of twos and threes, and lately as regional organizations. The type of progress that you knew was yours to make, became unwieldy under the auspices of a large, all-encompassing parent framework, however, and so you decided to rear your own child. Now, for the first time, you have gathered under one national banner, under one roof, as a collective individual to serve a common goal and further a mutual aim. Had you chosen instead to adopt the Moroccan philosophy of "Seek ye not the moment; wait for it," we would not be here under your auspices today. Instead you have heeded the advice of the old man to his grandson who, in "Anthony Adverse," was about to start on a journey, when the old man said, "You will find at the Inn at Trochate, excellent bread, meat, and wine—provided you bring them with you." This is the philosophy that brings you together today. You have brought the bread of the South, the meat of the Midwest and the wine of the Pacific Coast, to the Hotel New Yorker, where you will set a mutual table of progress.

Over the years I have known surgeons who regarded their suture nurses as a type of juke-box, into which went a request, and from which came a Kelly clamp. Yet, even those surgeons have come to the inescapable conclusion that their nurses were equally responsible for the conduct and the outcome of the specific case. It is gratifying now to see you remove your rubber gloves, drop your face masks, and step down from your standees, to put your feet squarely alongside our own, closing the ranks for the forward march. You are no longer the children of our profession, you are its sisters, showing us the coming of your own maturity through the production of your own child, the Association of Operating Room Nurses.

How to Avoid Overloading O.R. Schedules

John G. Steinle, Research Consultant, Cresap, McCormick & Paget, New York City

● Ideally, the operating rooms should be constantly occupied, during the day, with breaks only for cleanup time. Flow of patients should be concurrent with the cleanup of the operating room, and the availability of the surgeon and the anesthesiologist. The operating room should be ready when the patient is ready for anesthesia and when the surgeon has scrubbed. Principal reasons why operating rooms are not in continuous use are:

1. *Overestimating or underestimating the time required for operations.*

Often an operating room is reserved for only two hours, but is used for three and a half or four hours. In other instances, so much time is allocated for each operation that there is a substantial time lag between operations. Such a lag usually leads to criticism by the surgeons. This lag is costly. A full surgical team either is standing by, or it is doing jobs which might very well be done by non-professional personnel. This is so-called "fill-in" work.

2. *Failure of the surgical staff and anesthesiologists to keep their schedules.*

This is probably the most common cause of disruption of operating room schedules.

3. *Lack of coordination between admissions and the operating room supervisor.*

I am sure all of you have had the unfortunate experience of having to cancel one or more operations in a day because after the operating room had been scheduled, the patient could not be admitted to the hospital. No rooms were available.

Above: Author Steinle

We should first identify the problem. Why does our schedule break down? I would like to show you a simple form which we have found exceedingly useful in diagnosing causes for delay in scheduling. (See Figure I). This form simply obtains the information which can be converted for graphic presentation. Figure II shows a method of graphically presenting this information. This material is an excellent educational device, both for the medical staff and the administrator of the hospital. You will note from Figure II that, in two instances, the sur-

OPERATING ROOM UTILIZATION FORM

DATE _____ OPERATING ROOM _____

(Complete one form for each operating room each day.)

TYPE OF OPERATION	TIME O.R. READY	TIME PATIENT ARRIVES IN O.R. ROOM	TIME OF ANESTHESIA	TIME OF INCISION	TIME ENDED

Figure 1

geons were late in arriving at the operating room floor, and once the patient was late. This presentation points up the failure of the surgeons to keep their schedules. It dramatizes the effect on the entire schedule.

All operating room cancellations should be recorded which are due to the inability of the hospital to admit the patient to a bed. This will identify the problem of lack of coordination between admissions and the operating room.

The operating room supervisor ordinarily cannot correct tardiness of the surgeon or control delivery of the patient. She can contribute to correcting this problem by obtaining the facts and by making them available either to the chief of staff or to the administrator of the hospital.

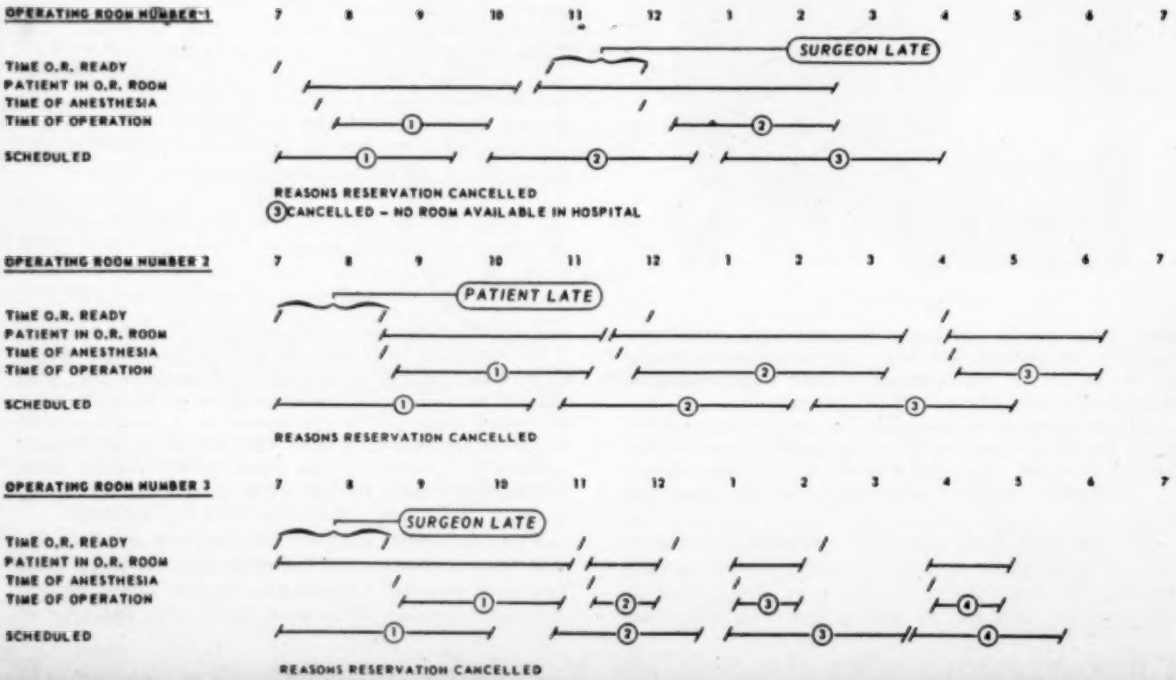
The next step is to estimate time of operations. Next to tardiness in the operating room, perhaps the most common problem is the underestimating or overestimating of the time required for each operation. A control method which can be used quite effectively is to have the surgeon estimate the amount of time which he will require when he makes a request for operating room time. Obviously, in itself, this is not sufficient to solve this problem.

We all know what delay and overtime do to morale in the O.R., especially since the feeling is that the delay could have been avoided. I suggest that a 5 x 8 card be kept on each physician. This card would give the type of

Figure II

OPERATING ROOM CONTROL SHEET

DATE FEB. 1ST 1954



operation, the time started, the time completed, the scheduled starting time, the actual time of performance and the estimated time. This card would give you a concise record of the promptness of each surgeon. It also would provide a basis on which the accuracy of the estimates of each surgeon can be evaluated.

From this information, compensation can be made for the overestimates or the underestimates by each surgeon. Figure III is an example of a surgeon's record card.

You might find it useful to maintain an average time by type and kind of operation from this information. You may find this very useful for new surgeons, or for those who have not used the hospital extensively. Often, the operating room supervisor will be asked by the scheduling surgeon what the average time is for a certain type of operation. I do not mean by this, of course, that a time criterion should be applied to the surgeons. It must be emphasized that we are not suggesting that a stop watch be put on the surgeons in the performance of their operations, but we must deal with averages and with estimates if we are to have satisfactory utilization of the operating rooms. We all know that emergency operations must have a time leeway.

Coordination of admissions and operating room is important. I find it almost impossible to discuss operating room scheduling without discussing, at the same time, methods and technics of controlling admissions. The problem is almost inseparable.

For each operation, two things must be consistent: a bed for the patient and available time in the operating room. A major problem of scheduling in the operating room can be corrected and much better service given the surgeon if the operating room supervisor's office and the admissions office are connected by a simple intercommunication system. In this way, the surgeon needs to call only the operating room supervisor or the admissions clerk, who then gets in touch with the other, and an agreement is reached as to a feasible time when the patient can be both admitted to a room and the operation scheduled. This can be done while the surgeon is on the phone.

It is interesting to note that hotels, which have much less available information as to the probable length of stay of the transient than the hospital has of the patient, do a much more effective job in determining the availability of rooms. The hospitals should have not only an estimate by the physician at time of admission, but also should have a periodic estimate of how long each patient will occupy a room.

I would like to show you a board (Figure IV) which we recommended for an admissions department. You will note that an estimate is made by the physician admitting the patient as to the probable length of stay. This is corrected by information provided by the resident as the patient's stay progresses. In this way, the availability of rooms can be predicted in advance. A board similar to this can very easily be adapted for the operating room supervisor in establishing controls for the operating room. I would not suggest this for a small hospital.

DISTRIBUTION OF OR WORKLOAD

One of the great problems in operating room scheduling is that all the surgeons want an operating room at

SURGEON'S RECORD CARD

SURGEON Montgomery, Edison G.

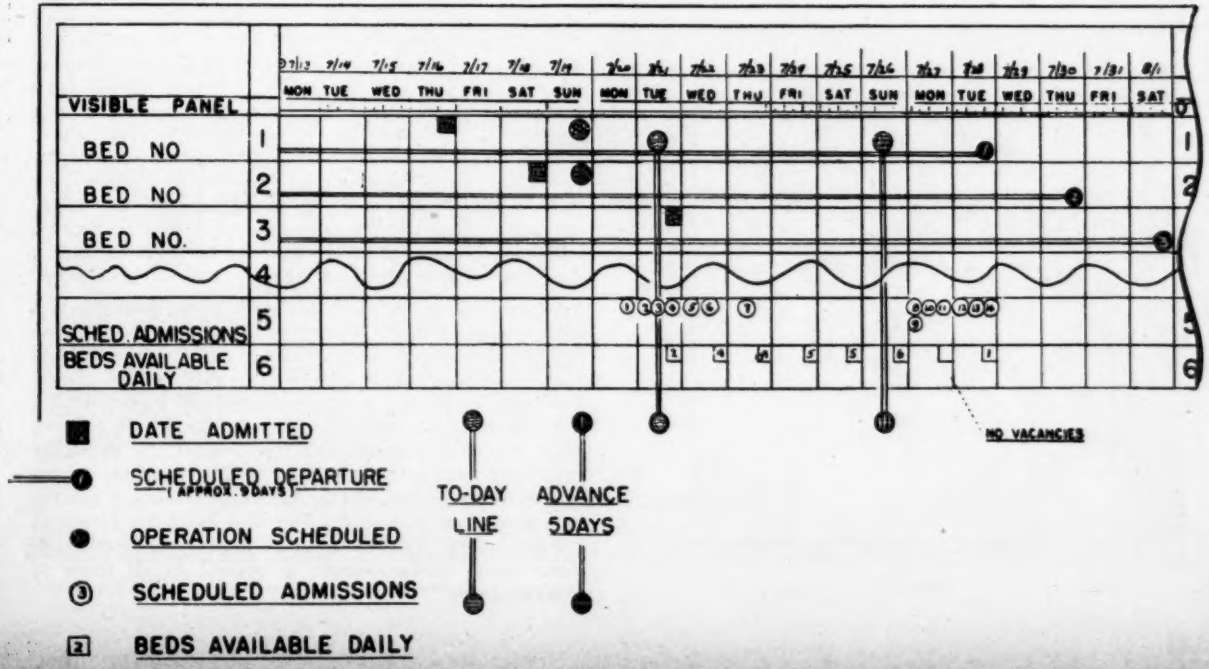
TYPE OF OPERATION	TIME STARTED	TIME COMPLETED	SCHEDULED STARTING TIME	ACTUAL TIME OF PERFORMANCE	ESTIMATED TIME
Herniotomy	8:10	9:50	8:00	1:40	1:30
Hysterectomy	1:25	3:50	1:00*	2:25	2:10
Appendectomy	2:35	3:10	2:20	0:35	0:30
Thyroidectomy	8:05	10:45	8:00	2:40	2:30
Closed Reduction – Tibia	12:35	1:55	Emergency	1:20	Emergency

* *Delay not due to surgeon.*

Figure III ◀

Figure IV

A PRODUC-TROL SYSTEM FOR



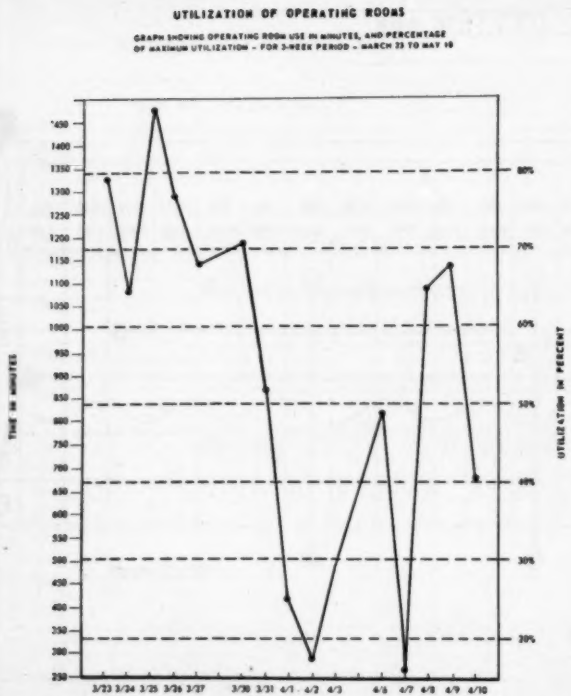


Figure V

the same time. Often we find that there will be one or two days in the week when the operating rooms will run at near capacity, and other days in the week when the capacity will be as low as 20 percent.

I would like to show you, in Figure V, a graph showing the day-to-day utilization of the operating rooms. Generally, operating rooms on a 40-hour week are used only approximately 50 percent. This means that a tremendous added expense results for the hospital because the staff is maintained for the full 40-hour week, although they are used for their trained purposes only 20 hours per week. I am sure some of you think you have solved this problem, or you feel it is not important because there is a great deal of other work to be done in the operating suite. I have been in many operating rooms where skilled operating room nursing personnel were cutting sutures or preparing packs. These are purely pedestrian activities which can be done effectively by nonprofessional personnel.

I would like to make another observation about the general tendencies in the operating room: those of utilizing the O.R. supervisor as an all-around substitute. Hospitals have never been able to recognize the fact that an operating room supervisor is an administrative person, and is not someone who should be used constantly as a scrub nurse or an emergency fill-in for one of the operating room teams. One of the prerequisites in establishing and maintaining controls and supervision, instead of serving as a utility member of the operating room team, is that the supervisor must supervise. The best controls will never work unless someone is present at all times to exercise them.

Above: The technical exhibits were crowded throughout the meeting.

NEW TRENDS IN SURGERY

FIVE surgeons discussed recent trends in their particular specialty during one of the sessions at the meeting of the Association of Operating Room Nurses in New York City.

Urologic Surgery

Thomas J. Kirwin, M.D., Attending Surgeon, Department of Urology, New York Hospital, New York City—I dislike using the pronoun, "I," because as a rule it is not necessary. However, I hope you will bear with me if I violate this principle for a few minutes and become personal.

I had the opportunity to teach histology, embryology, and anatomy under the great genito-urinary anatomist, George Huntington. He had a dictum of which I wish I could say I was the author and I would like to quote it to you. It was "In every operation no matter on what organ or organs, the least you disturb the normal anatomy the better for the patient and the fewer headaches for the surgeon and family." In my experience this has always proved to be true and a sound bit of advice.

To perceive a trend one must look back. Twenty-five years ago I recall that we had, for example, but two operative procedures for enlargement of the prostate—no matter whether the increase in size was due to benign hypertrophy or malignant neoplasm. Differential diagnosis was more or less uncertain. The usual procedure was to do a biopsy specimen and put our trust in whatever the pathologist had to say about it. Now we have many other means of obtaining more exact diagnosis. To mention but one, Jewett's bimanual palpation under anesthesia for carcinoma of the bladder illustrates the trend toward more exact preoperative diagnosis. Biopsy for all suspicious lesions of the genito-urinary tract when available is still essential. This in particular applies to lesions of the bladder or prostate.

We now have four operative procedures instead of two for prostatectomy. The older perineal and suprapubic technics have been supplemented (you will notice I do not say superseded) by the retropubic and intraurethral methods; cold statistics now show that there has been a distinctly downward trend in both morbidity and mortality since these procedures came into use.

Left: Speakers in the panel on "New Trends in Surgery" were (l. to r.): Samuel A. Thompson, M.D., chief of chest surgery, Flower-Fifth Avenue Hospital and St. Clare's Hospital, New York; Thomas J. Kirwin, M.D., attending surgeon, department of urology, New York (N. Y.) Hospital; Marion W. Sheahan, R.N., associate director, National League for Nursing, New York City, moderator; Alexander Brunschwig, M.D., chief of gynecology service, Memorial Center, New York; John Marquis Converse, M.D., associate professor, clinic surgery (plastic), New York University College of Medicine, Bellevue Medical Center, New York City; and Walter Ludlum, M.D., associate attending surgeon, New York (N. Y.) University Hospital.

A SIMILAR TREND

In surgery of the kidney and the upper urinary tract we can discern a similar trend. Steady improvement in cystoscopic and pyelographic instruments and the introduction of such measures as excretory urography have made diagnosis easier and more complete and have abolished the "guess work." Calycectomy helps to prevent the reformation of calculi and pyeloplasty is a procedure for the relief of urinary obstruction which, with the assistance of the "wonder drugs," has remedied thousands of cases of urinary tract infections that only a short time ago would have led to chronic invalidism and early death.

The same may be said of every other type of surgery of the genito-urinary tract. The advances have been so great that when I look back, I wonder how I ever managed to do as well as I did "in the good old days." Then I realize that the greatest advance of all has been in the increased efficiency of the operating-room nurse—that is, in my own particular field, the special urologic nurse. I never understood how much the success of any of my operations depended upon the aid of these specially-equipped helpers until I had to do without them as, for example, when I have been called perhaps in an emergency to work in an unfamiliar out-of-town hospital designed only for "general" surgery.

This brings me to a trend I should like to inaugurate and urge all operating-room nurses to follow—the acquiring of a better understanding of urologic problems as they are encountered in any type of surgery and, as a corollary to this, the practice of including special equipment for urologic work as a part of the routine set-up for any kind of operative surgery.

A few of the items that are frequently overlooked are as follows:

K-Y Jelly
Foley catheter bag
Sounds
Kocher-Ochsner clamps
Bulb Syringes (two)
50 cc. Luer lock syringes with adapter for Foley bag
Presacral oxygen insufflation should be demonstrated at least once prior to operation.

Cancer Surgery

Alexander Brunschwig, M.D., Chief of Gynecology Service, Memorial Center, New York City — My topic, trends in cancer surgery, is a large and controversial one.

In the early part of this century and at the end of the last century many operations were devised for cancer but the patients did not survive long after. A great wave of pessimism swept over the medical profession. Cancer was regarded as a hopeless disease. The operation might be successful if the cancer was small enough, but the disease was rarely diagnosed early and even though treatment was started the patient eventually died.

When the Curies and Roentgen came into the picture great hopes were had for the success of radiation. Limited successes were had by the use of x-rays and roentgen ray treatment of cancer.

In the meantime, other advances have been made by treatment with hormones. Although hormones give patients

relief, definite cures are really not yet expected or probably never will be expected considering what we know about hormones today.

With the recent advances, mainly in all the supportive measures of surgery—improved anesthesia and the prevention and treatment of shock—surgery took a big plunge forward in its activity, especially in connection with cancer.

Shock was the first great cause of death in earlier days and second was infection. Infection is in most instances controlled by antibiotics.

When shock is due to reduction in the volume of circulating blood caused by hemorrhage, we can control or prevent the shock with adequate amounts of transfused blood.

Now we have blood banks—we not only give one blood transfusion, but can put in two or three or more in rapid order if necessity demands. That makes operating a lot safer, and it makes operative attack on cancer much more extensive.

Then there is the newer anesthesia method in which we use drugs to bring about certain things that we want to have happen. An example is the removal of the left lobe of the liver which I carried out on a patient for metastasis. Here the blood pressure could be dropped at will. Now that does not mean shock, because this reduced blood pressure is the result of vasodilation. If we keep the blood volume up we can lower the blood pressure, take out half the liver, run the blood pressure up again and the patient loses little blood. These are just two things that make operations a lot safer.

Until a short time ago, anyone that would operate on liver metastasis would certainly be brought before his hospital board and accused of not having his feet on the ground and of being a little shy on judgment.

But I had a man who had carcinoma of the stomach removed 10 years before—it is a long time to go after a radical gastrectomy for cancer. I saw him over a year ago and he had a painful mass in the left upper quadrant which prevented him from doing what little work his family would let him do.

He had had x-ray therapy and had a chronic ulcer of the skin because of too much x-ray therapy, and the ulcer was also giving him quite a bit of trouble.

He was told that the metastasis could be removed, giving him relief. When we opened the abdomen, not only was the left lobe of the liver completely involved but there were five metastases which we took out of the right lobe. Now he is living and well, a year and two months later.

THERE IS CONTROVERSY

There is the controversy. Are these big operations justified? Are the results that we get from them so indefinite that they shouldn't be carried out, because they do take a lot out of the surgeon, the patient, and the operating team.

I think they are justified and I have some cases which show why I believe they are.

One patient, a 60-year-old lady, couldn't eat because her stomach was extensively involved with cancer which had extended back into the body of the pancreas. In a patient of that age it is easy to say, "Give her morphine, let her die in peace."

They do not die in peace. That is one thing of which I am convinced. Anyway, as a result of total gastrectomy and partial pancreatectomy and splenectomy this patient is living and well five years later.

An operation which is still controversial is total pelvic exenteration which is carried out when cancer in the pelvis involves the bladder, the uterus, vagina, and the rectum.

Cancers of the uterus, the rectum, cervix, will stay there a long time and that gives radical surgery a chance. One of the operations that has been developed is removal of all the pelvic viscera, the ureters are put into the colon, and the patient wears a bag over the colostomy. In this type of colostomy, urine and fecas are discharged through the same opening. Patients that require this operation are in the advanced stages of cancer and it is this or nothing, unfortunately. They had had not one, but several attempts to cure their cancers of the cervix by radiation. These were a wretched group of patients. I know that these patients would not have lived five years if nothing had been done.

This operation was devised originally for palliation. That was all we expected for a while but we were as surprised as anyone to find that patients were cured for five or more years. One patient had a specimen consisting of the rectum and the uterus, vagina, and bladder. The specimen was removed and this lady is living and well after six and a half years.

These people are fully adjusted and as you see them and talk to them you would never know they had this operation.

Another patient had a total pelvic exenteration. Today he is back leading his symphony orchestra for international broadcasts. It has now been more than five and a half years since surgery was done.

These are the advances in radical surgical treatment of cancer. There is a lot of grief connected with this type of surgery. The majority of these patients do not live five years. In the case of advanced cancer of the cervix, we have salvaged 12 percent of the patients for five-year survival. We have salvaged 28 percent for three-year survival.

The more we learn about these new operations, the better position we will be in to pick patients, select the best cases, and not do operations which we know will be foredoomed to failure.

This is a day of specialization, special kinds of surgery require special groups for teamwork. Up to a short time ago, many operating room supervisors liked to rotate nurses to all rooms in order to give everyone as wide an experience as possible—this is fine theoretically. But I think if we are going to do special types of surgery in the fields of special diseases, such as advanced cancer, we have to try to train teams that stay in this field and that know all the aspects of special kinds of surgery, rather than try to rotate everyone through all fields.

Certainly in doing this kind of surgery the nurses are extremely important factors in this team. Because it is special work, it takes individuals with special likings and special abilities along certain lines and those who like it and want to go in for it should be encouraged.

Cardiac Surgery

Samuel A. Thompson, M.D., Chief of Chest Surgery, Flower-Fifth Avenue Hospital, New York City—Cardiac surgery was late in getting started, but it has progressed in so many directions that it is difficult for one individual to keep abreast of all branches.

Rapid development is still going on in the use of the artificial heart; in the development of blood vessel banks and blood vessel grafts; and recently in the development of a woven plastic cloth, much like nylon, which can be used in place of a blood vessel. Another development is the use of refrigeration in anesthesia. We use refrigeration to decrease the metabolism of the body; to decrease the necessity for the nourishment to the brain; to slow the heart; and to slow the flow of blood.

Refrigeration can be done in a number of ways; to the general body by external application; or by withdrawing blood and cooling it in a machine, then reinjecting it into the body. And the newest and probably the most interesting one at the present time is the intravenous use of chemicals which have an effect on the heat regulating center of the brain, which allows the temperature of the body to be rapidly dropped. This is called "artificial hibernation," and I believe this latest method holds a tremendous amount of advancement in store for us.

I would like to list a few of the disorders which surgery can benefit.

The so-called patent ductus is probably the most frequently operated upon of all the cardiovascular disorders. If uncorrected it results in death in approximately 75 percent of the patients before the age of 40. Only one out of four of these people ever lives out a normal lifetime. The desired correction for this is to sever the ductus.

Another disorder is coarctation or obstruction of the aorta. This obstruction may be a short, hour glass deformity or it may be a long, narrow and spindle-like constriction. The ideal correction is to remove the obstructing portion completely and if possible do an end-to-end anastomosis. Sometimes the area is so long that we have to use a graft, and up until recently we have been using blood vessels from the blood vessel bank. We believe that before long, it will be possible to use a woven plastic cloth in place of the blood vessel.

Next are the anomalies of the aortic arch in which a vessel, abnormal or abnormally placed, surrounds the trachea and esophagus and produces difficulty in swallowing and in breathing. This is noticed particularly in young children. The method of correcting this is to take whichever vessel is the smaller and divide it. This breaks the ring.

Another disorder is an abnormal and also an abnormally placed subclavian artery running behind the trachea and esophagus. Here again the procedure or correction is to simply divide the vessel in half and break the ring.

We should consider actual cardiac lesions. Congenital stenosis of the pulmonary valve may occur as an isolated feature. It more frequently occurs, however, in conjunction with what is called Tetralogy of Fallot or the so-called blue baby.

The pathology of the blue baby consists partially of a displacement of the aorta. Instead of coming off the left ventricle it comes off of both left and right ventricles. In this way some of the venous blood from the right side of the heart gets into the aorta. In other words, the arterial blood stream is polluted with venous blood and too little blood gets into the lungs for oxygenation.

TWO CORRECTION METHODS

There are two methods of correcting this: Blaylock's method using the subclavian artery, bringing it down either on the right side or the left side and doing a side-to-end anastomosis with the pulmonary artery. Pott's method is to do a side-to-side anastomosis of the pulmonary artery and the aorta.

One of the most dramatic episodes in heart surgery is the development of operations which take place inside the heart itself. These procedures are done particularly for valves that are obstructed or leaky, and for defects in the wall that separates the right and left auricle. The greatest success in correcting these deformities has been in relieving the obstruction valve, particularly the mitral and aortic stenosis.

These valves are opened by finger dilation or so-called finger fracture, or the leaflets are cut with a special knife or a dilating instrument. The pioneers in this field are Dr. Bailey of Philadelphia and Dr. Harken of Boston.

Probably the most common of all forms of heart disease is coronary heart disease. Last year it was responsible for 22 percent of the total deaths in the United States.

At present there are several methods of correcting this disease by attempting to re-vascularize the myocardium. The heart muscle becomes incapacitated because of the lack of blood supply, and our two main methods are tissue grafts and vascular grafts.

The tissue grafts alone which have been used are not too satisfactory. The granulomatous graft, however, with the use of magnesium silicate has been satisfactory.

In the Beck procedure we use an artery and that is connected between the aorta and the vein of the heart. The pressure of the aorta being higher than the vein of the heart, the blood then runs in a reverse direction so that we use the venous system of the heart to supply arterial blood. In the second operation, the coronary vein is partially obstructed so that the blood that comes from the aorta will not go on back into the vena cava, but will go back and furnish an arterial blood in a reverse path. This is called "arterialization of the myocardium through the venous system."

The Vineberg operation is another vascular graft technic in which the internal mammary artery is dissected from the chest wall and taken down and implanted in the wall of the myocardium.

Cardiopexy or the "talcum powder operation" induces a myocardial hyperemia, by inserting powdered magnesium silicate inside the pericardial sac which in turn produces a granulomatous adhesive pericarditis. A small piece of the left fifth cartilage is removed, the incision is carried down beyond that, the pericardial sac is opened, the fluid is aspirated, and with a special cannula magnesium silicate or talc is distributed widely over the surface

of the heart, all borders, and the pericardium and chest wall structures are closed without drains.

I have attempted to mention a few of the most successful operations. I want to emphasize what has been said by Dr. Kirwin and Dr. Brunschwig, that this is a process of team work. We can't get along without team work. Frequently a good operating room nurse is the difference between a difficult or impossible operation and an easy operation.

Plastic Surgery

John Marquis Converse, M.D., Associate Professor of Clinical Surgery, New York University College of Medicine, and Surgeon Director, Plastic Surgery Clinic, Manhattan Eye, Ear, and Throat Hospital, New York—As we go back over the history of surgery, we find that the first of a number of forward steps was the development of anesthesia; the second, the possibility of controlling infection, and the discovery of antisepsis; third, the control of shock; and recently, of course, the development of the newer drugs, the antibiotics. All of these advances permitted improved technics and new types of operations.

The next phase of surgery will be a phase of transplantation. We have gone about as far as we can go in the excisional surgery of organs. The day may come when we will be able to replace them by tissues removed from other individuals. This is already being done with bone, arteries, and cornea. However, there are many structures that cannot be replaced because the secrets of homo-transplantation are not entirely known to us.

When skin is transplanted from one individual to another, the skin behaves at first as though the skin were the patient's own. After eight days, however, the blood vessels that have grown into the graft become clogged and thrombosed, and the graft dies.

Why does this take place? The solution of this problem may lead to the attainment of such dreams as the transplantation of the heart and other organs.

Although plastic surgery is often thought of as one of the newer specialties, it was practiced in India two thousand years B.C. At that time reconstruction of the nose was performed because of the practice of cutting off the noses of criminals and unfaithful women.

Plastic surgery has made great strides. Today it is an established specialty, with its own specialty board, and many well-organized specialized services.

HIGHLY SPECIALIZED CARE REQUIRED

I do not think there is any field in which more specialized nursing in the operating room is required. The work is time-consuming, minute, and highly diverse in its activities. We transplant skin, bone and cartilage in all parts of the body, and it is always a puzzling task for a nurse to set up for a plastic surgeon.

I would like to say a few words about my own special interest, facial disfigurement. Individuals are disfigured by accidents (which are becoming more frequent in our mechanical age) and through congenital deformities. One child in 750 is born with a cleft lip or palate; one individual in 50,000 is born with one ear missing. There are many other congenital deformities, such as hairy moles on the face. A frequent cause of deformity is cancer. Cure of this disease may require the excision of a large portion of the face. This may produce a deformity which,

to the patient, is worse than the disease.

If I had a crippled hand, I could put my hand in my pocket, and you would not know of my deformity. If I were a paraplegic, I could sit here giving an illusion of normalcy. But if my face were greatly disfigured, you would know it. I would know it because each time I looked in the mirror I would see it. This situation produces emotional disturbances in the patient, causing serious psychological as well as physical problems.

As an example of traumatic injury, a child involved in an automobile accident suffered severe fractures in the region of the middle third of the face. With adequate early treatment this case seems to be well repaired. It is important in these situations to place the patient in the hands of someone experienced in the treatment of facial injury. The best time for treatment is early. If the wrong procedures are used in the early stages, it is difficult to repair the damage later.

An illustration of another traumatic deformity involves a cosmetic defect—a twisted nose coupled with a functional impairment because of the deviation of the nasal septum and nasal obstruction. These operations, in which it is possible simply to replace tissues in their original position, are extremely successful.

Another nose injury in early childhood resulted in nasal obstruction, and associated deformities, as frequently happens, included maldevelopment of the lower jaw. By means of corrective surgery of the jaw and bone grafts, it was possible to restore a normal appearance.

A further example involves a patient who had carcinoma. The left maxilla was resected. This resulted not only in deformity, but in a severe functional disturbance because of the loss of support of the left eyeball. The left eyeball was lower than the right and the patient suffered from diplopia.

The patient is a theatrical costume designer. She is highly successful and her name is seen frequently on television. She was unable to carry on her work and remained in this condition for four years until we reconstructed the maxilla by means of bone grafts. The result was restoration not only of the appearance, but of normal functioning of the eye. She has now returned to normal activity and is carrying on her job. This is a fine result of cancer surgery. It is now seven years since this patient's operation.

Here is an example of a frequent deformity caused by the eradication of cancerous tissue: The patient had worked many years with an oil company and had been exposed to the sun in areas like Arabia and South America. The cancer began like a pinhead on the face and finally required excision of most of the nose. Two initial operations were made, and a forehead flap was brought down before the final "trimming" was done. Sometimes we have to wait three or four months after the first operations in order to give the nose a better shape.

An example of the social tragedy of facial disfigurement is the case of a child born with an extensive hairy nevus covering one half of the face. The anguish of the mother who gives birth to a child of this sort is easy to imagine. The birth of this child caused a tremendous upheaval in the family.

The child was first brought to New York when she was six months old, and the first surgery was done when she

was one year and three months old. The work is now nearly completed.

The method used in this case was the gradual replacement of the skin of the neck by bringing it onto the face. There is a particularly favorable condition that exists in young children. They are capable of producing new skin, and the skin of the neck can be stretched over the face.

In the case of this child, the first surgery produced free grafting on the forehead and a rotation flap from the neck. Six months later the rotation plan reached the outline of the eye. The child is now five years old, and we have nearly completed the case.

NEED FOR EARLY CORRECTION

Another case illustrates the need, whenever possible, to eradicate a deformity early—before the child goes to school and comes into contact with other children who say, as they did to this child when she was two years old, "Why don't you rub the dirt off your face?"

An example of jaw deformity is illustrated by a birth injury by forceps producing ankylosis of the jaw. This resulted in a malformation of the mandible with inability to open the mouth. In this case, two bone-grafting operations were performed to rebuild the mandible.

The next examples happen to be nurses, both with serious problems connected with jaw malformations. They represent a typical example of prognathism corrected by a simple operation consisting of a bilateral section, under local anesthesia, of the ramus of the mandible, in which the mandible is repositioned.

The next patient had a very complex deformity. This patient was particularly interesting to us because of her story. She had always wanted to be a nurse, but no nursing school would take her. She finally did succeed, however, in entering one of the nursing schools. She had been seeking treatment for years and her case was very complicated. She had had a fracture, at the age of eleven or twelve, which had caused tremendous malformation of the jaw. The first of four operations was made to section the mandible on each side and correct the occlusal relationship of the jaws.

Next, the lower half of the right side of the body of the mandible was excised and the inferior alveolar nerve was removed and transferred to a higher level in order to preserve the sensation of the lower lip. Then final bone-grafting procedures were done. In addition, a nasal plastic operation was performed to complete her facial improvement.

We decided the operation was a complete success when the patient came in a few months later to inform us that she was now happily married.

Traumatic Surgery

Walter Ludlum, M.D., Associate Attending Surgeon, New York University Hospital, New York — There is some confusion in many minds as to where general surgery leaves off in the care of the injured, and traumatic or orthopedic surgery begins. In many institutions there is harmony and close cooperation between the general surgeons who care for accident cases and may form a fracture or traumatic surgery service, and the orthopedic surgeons. In any event, those who are interested in traumatic surgery and who are specially trained and equipped

to handle the injured, are those who in most institutions do the bulk of the work.

My particular specialty, the care of the injured, is probably the oldest field of them all. Before there were individuals who specialized in caring for the sick and the injured, before doctors existed at all, there were perhaps common-sense people, people with a knack for caring for those who were sick or injured, who would undertake the care of those in their community who were hurt. Common sense would indicate, when there was an obviously broken arm or a leg, that the parts be drawn into a relatively normal position, or "set," as the expression has been; and secondly, that they should be held by some means in that corrected position.

That being true, how could there be any phenomenal advances in the last 50 years, particularly in the last 10, 15 or 20? Surprising as it may seem, there have been these advances.

At the turn of the century the age-old method I alluded to, of setting a broken bone with the hands and holding the part in place by some sort of splint or cast, was still largely in vogue. Occasionally, in some special circumstances, a particularly courageous surgeon would undertake to do an open correction. But by and large, fractures and dislocations at least were treated by the manual means of reduction and by fixation with splints or casts.

Then, with the turn of the century, surgeons became bolder and undertook more frequently to perform open corrections. They still were deterred by the bugbear of infection. Not that infection was necessarily more probable in operating on the bone, but it was usually more disastrous than when it occurred in other types of operations. Hardly anything was a greater detriment to a man's practice or a greater burden on his own conscience than to create through his surgery a condition of osteomyelitis. The old expression, "Once an osteomyelitis always an osteomyelitis," was an axiom of those days.

So instead of open correction becoming popular as the twentieth century wore on, traction and suspension were substituted in certain cases for manual reduction and the application of plaster of Paris or other forms of support. Traction and suspension offered certain advantages. When skillfully applied they would obtain and maintain reduction of a fracture very nicely, and would permit certain attentions to the patient in general and to the injured part in particular that would not be possible if a cast had to be applied. A patient with a fractured shaft of the femur or with an intertrochanteric fracture of the femur could move about in bed with some facility, and could be attended to in bed by the nurses with greater ease than if he were encumbered in a cast that would envelop him from the armpits to the toes.

Traction and suspension had their place and were a great advance over methods previously used. Twenty or 30 years ago, the beds in a ward where fractures were cared for would have fracture frames erected, and practically every patient would be in traction and suspension.

Just over a decade ago antibiotics came into use, and surgeons had a new impetus and a new facility in applying technics to a broken bone. They found that osteomyelitis could now be easily prevented and controlled, and they proceeded with more courage to perform open corrections. There were other advances, too. Naturally our ideas of how to hold a bone with internal fixation have

improved with trial and error and the use of engineering skill and metallurgy, and the development of new materials, different types of steel and vitallium. With all these advances a new wave of enthusiasm for open correction appeared.

ADVANTAGE OF OPEN CORRECTION

What is the advantage of open correction in a fracture? The most dramatic illustration would be fractures of the thigh bone or the femur. In the uppermost portion of this bone the fracture is at the neck of the femur, the so-called fractured hip. Dr. Smith-Petersen devised a three-phalanged nail for use in holding a fractured hip after reduction. Because of his original inspiration and skill, the method has been adopted by others around the country, till now practically all patients who have fractures at the neck of the femur are treated by reduction and nailing. This injury most commonly affects elderly patients and other patients who may be rather poor operative risks. These patients have been subjected to reduction with the Smith-Petersen method with increasing skill and success, and with minimal risk.

It's not just the development of the antibiotics, nor the inspiration of this one particular operation that reduced risk in these cases. It has been improved medicine in general, improved surgical technics, and improved technics of anesthesiology which have facilitated the use of internal fixation.

Having been so successful in such a technic as that mentioned above, many surgeons are now applying the technic to the area just beyond the hip capsule, namely the trochanteric area. Fractures in this area are actually more numerous in our hospital statistics than fractures within the hip joint itself.

On some surgical services, almost 90 percent of these trochanteric fractures are treated by open correction and internal fixation. Almost 100 percent of the intracapsular are so treated. Down the shaft of the bone toward the knee, during the last decade or so it has been found practicable to apply a new technic of fixation. This is intramedullary nailing or medullary nailing. It involves an operation upon the fracture site and placement of a very strong metal device within the marrow of the bone. This device in itself is so secure and so strong that in most instances no external support is required. In various hospitals, where this technic is employed and advocated, two-thirds of the femoral shaft fractures are treated by intramedullary nailing.

The Smith-Petersen nail comes in a variety of different forms but has three phalanges. It may or may not be cannulated. A modification of it includes a bar which can be attached to it with a nut and a lock washer which in combination makes a fine device. It is somewhat like the Jewett nail. The combination device and the Jewett nail and other similar devices are used in the trochanteric fractures.

I would like to point out, in the case of the femur, the tremendous advantage of these new technics. In traumatic surgery we have a branch of surgery that extends back to the days of the aborigines, and yet in the last 15 or 20 years we have developed a new concept of the care of traumatic cases.

What is the new concept? It is the setting of the fracture and the holding of it by an internal fixation device,

which is so secure and so strong that no external support or splintage is required. You have seen an elderly person with a fractured neck of the femur adequately reduced and nailed. The day after the operation she is out of bed. Soon she is swinging along on her crutches. Within a few days or a week or two she may go home.

The same is true of the trochanteric fracture, and even more remarkably true of some of the shaft of the femur fractures. Instead of the patients' being confined to bed interminably, lying in a cast which extends from the arm pits to the toes, in which they are completely helpless and dependent upon the nurses and others to assist them and tend to their every want, they are now out of bed very promptly, swinging along on crutches very soon, and are at home often within two or four weeks. Best of all, results currently are generally far superior to those obtained in the old days under the old treatments.

We are at the dawn of a day when we can treat many fractures so efficiently with internal fixation that external fixation isn't required. The injured part can be used as relatively normal from almost the first day post-operative.

The various Catholic orders were well represented at the conference. Shown here are (l. to r.): Sister Elvon, clinical instructor in surgery, and Sister Theonella, O.R.S., both from St. John's Hospital, Springfield, Ill.; Sister Mary Frederick, O.R.S., St. Mary's Hospital, Minneapolis; Sister Charles Mary, O.R.S., St. Joseph's Hospital, St. Paul, Minn.; and Sister Mary William, O.R. nurse, St. Charles Hospital, Brooklyn.

The Surgeon's Responsibility *to the* Operating Room Nurse

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AS a surgeon, I am indeed grateful to the nurses with whom I have been associated. This gratitude stems from the infinite help given me both within the operating room and at the patient's bedside. Nurses in their longer contacts with the individuals have more opportunities to observe behavior and to listen to expressions of thought under varying conditions than do physicians whose contacts are necessarily intermittent and brief. The concise listing of pertinent symptoms and reactions to treatment has enabled me to treat my patients more effectively.

The operating room and bedside nurses of today have developed clinical judgment and initiative which make them definite members of a skilled team. Considerable maturity of personality development is a prerequisite for this type of nursing care. The nurse must be able to direct her actions and verbal expressions on the basis of a sound understanding of human behavior and human relationships. If she does not have these qualities and discipline, she may contribute to the patient's illness, or counteract the efforts of other professional workers.

I should like to speak specifically of my operating room nurse. In many ways her responsibilities towards preserving human life are greater than in any other service of nursing. Much of her day is spent dealing with emergencies where most of her senses are being exercised to their utmost. Yet, for the most part, she serves quietly and humbly, and her reward, both spiritually and materially, does not seem great. Many times a long and tedious

surgical procedure may culminate in mental abuse.

Every surgeon, when entering a particular operating suite for the first time, should review basic instruments and sutures and discuss any personal idiosyncrasies with his nurse. If, during the actual surgical procedure, particular steps are explained and surgical pathology pointed out, there will be no lapses in interest and efficiency will be maintained at its highest.

But let no one think that better nursing as it is practiced today through highly scientific technics, and as it is likely to be more widely practiced tomorrow, can be done with justice to patient or to nurse on the basis of the training still provided in some hundreds of existing schools of nursing. The physician and surgeon has not completely recognized this new concept of nursing or added his support and encouragement. Rarely, in fact, is the nurse accorded so much as the prestige of being considered the colleague of the physician. She is primarily a person who takes and carries out orders. As a consequence, she tends to develop those undesirable characteristics of subservience to persons above her in the hierarchical structure and mastery over those below her.

The authoritarian atmosphere existing in many hospitals is one of the greatest handicaps to personality development. When young women or men live in such environment, they become insecure, frustrated, emotionally unsatisfied, and punitive (or quarrelsome). How can nurses of such temperament give supportive care to the sick and establish normal emotional balance which they themselves do not possess? When these basic conditions are remedied, larger numbers of young women and men of greater educational and emotional maturity will be attracted to professional nursing.

I am happy that progress is being made in the material and physical conditions of the work of the nurse. Certain conditions have improved greatly. It is now possible for many more nurses to lead a more normal life than at any other time since secular nursing was first organized. Comparatively recently their working day has been limited to eight hours, and five to six days per week. Most are receiving an income permitting a modestly comfortable way of life with protection against unemployment, sickness, and old age. It is significant that a few may even leave their staff positions for intervals to obtain added education and prepare for a special field of service.

A reluctant step by the professional nurses has been taken in the recognition of an assistant group designated as "practical nurses" or auxiliary nursing aides. The pressure of circumstances in most hospitals is leading to an organized educational program for such personnel.

Hospital authorities, government officials, and the senior profession of medicine, all have been transferring new responsibilities to nursing in steadily increasing quantity since World War I. These same groups, however, have done little to support the development of nursing education in a corresponding measure.

It is now quite obvious that schools of nursing of two distinct types are urgently needed. Both are in existence but are fighting for their lives, in need of financial support. The one type, called the junior school, is, at its

best, taking the form of an exceedingly good technical school that provides technical training in an atmosphere of science and humanism. This atmosphere can be maintained only by an excellent teaching staff: nurses who themselves have had the best of technical training combined with broad general education in a university school of nursing.

Resources for nursing education also must include the university school. The number of nurses to be prepared will be relatively small, but the school is nonetheless essential. At least three special groups need this educational opportunity: the executive staff of hospitals, the teaching staff for all nursing schools, and the medical social workers known as public health nurses.

One must hope strongly that there will be no class distinction between the graduates of the university school and those from the junior or non-university school. Surely, all graduate nurses can be members of the same professional association.

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Below: New York nurses crowd around popular surgeon Elliott Hurwitt, M.D., Montefiore Hospital, New York, at conclusion of problem clinic. He was surgeon on panel: L. to r.: Barbara Volpe, Evelyn Rogers, Ruby Tomlinson, Dr. Hurwitt, Frances Reeser, Doris Deimel, and Helen Walsh.

The O.R. Problem Clinic

Questions and answers from the most popular session at the First National A.O.R.N. Conference, New York City

MODERATOR: Margaret C. Giffin, R.N., New York City, Assistant Director, Department of Hospital Nursing, National League for Nursing

Participants:
SURGEON: Elliott Hurwitt, M.D., Chief of the Surgical Division, Montefiore Hospital, New York City

L. to r.: Dr. Collins, Miss Condon, Dr. Spaulding, Mother M. Alice, and the moderator, Miss Giffin.

ANESTHESIOLOGIST: Vincent Collins, M.D., Director, Department of Anesthesiology, St. Vincent's Hospital, New York City

DIRECTOR OF NURSES: Edith Roberts, R.N., Director of Nursing, Methodist Hospital, Brooklyn

OPERATING ROOM SUPERVISOR: Marie Condon, R.N., Operating Room Supervisor, Jersey City Medical Center

OPERATING ROOM CONSULTANT: Frances Ginsberg, R.N., Consultant in Operating Room Nursing, Bingham Associates Program, Boston, and Assistant Clinical Professor of Nursing, Boston University School of Nursing

BACTERIOLOGIST: Earle H. Spaulding, Ph.D., Professor of Microbiology, Temple University School of Medicine, Philadelphia

ADMINISTRATOR: Mother M. Alice, O.S.S., St. Clare's Hospital, New York City

STERILIZATION AUTHORITY: John Perkins, Research Director, American Sterilizer Co., Erie, Pa.

L. to r.: Dr. Hurwitt (answering a question), Miss Roberts, Miss Ginsberg, and Mr. Perkins.

Q. Miss Ginsberg, is the R.N. in the O.R. going to be replaced by technicians?

MISS GINSBERG: It is not the intention of a surgical-technical aide program to replace qualified graduate nurses. This is an augmentation plan, to *extend* the use of the professional nurse—not to usurp her prerogatives, not to take away from her, but to help her do a better job in giving care to human beings. I don't know how else to put it.

Q. Dr. Hurwitt, what do the doctors say in regard to having surgical-technical aides scrub for specialized major surgery?

DR. HURWITT: I think in answering a question like this, one has to consider both his own personal reaction and the problem as a whole. Speaking as an individual surgeon, I say there is no question that all of us like to have one scrub nurse, a favorite scrub nurse, a girl who is a whiz-kid, and who gets to know exactly what you're going to do before you've done it; a girl to whom you don't have to say a word during the entire procedure; a girl whose back you will not be able to see when you look for an instrument, but a girl who will be looking at you and will be able to respond. There's no question that this is a tremendous source of comfort to the doctor, and is probably in the last analysis in the best interest of the patient. Because of the greater facility with which the procedure can be accomplished, the individual patient is better off, I'm sure of that.

On the other hand, this practice builds monopoly that makes for no training at all, and provides no opportunity for substitution. And at the Montefiore Hospital (New York City) the only hospital with which I am associated at the present time, we have never condoned this type of routing of nurses in specialized areas. We have girls who are better at some things than others, but all procedures should be within the province of all people working in the operating room, from the most experienced R.N. to the techicians in training.

Obviously we cannot take an operating room technician and assign this individual to a mitral valvular commissurotomy or an intracardiac procedure early in her training, or in the middle of her training, or even toward the end of her training. But if such a technician then stays in operating room work, with continuity in a program where this work is being done with sufficient frequency that it's not a crisis every time such a case is scheduled, I see no reason at all why a competent technician should not be as familiar with procedures as a competent R.N.

I use the word competent advisedly, because putting the label "R.N." after anybody's name far from qualifies this individual as a competent O.R. nurse.

Q. Should the technician be permitted to give medication?

MISS GINSBERG: That question is directed to me, I think. The outline that I gave you was most incomplete; it was a generalized program for teaching. In every hospital where these courses have been and will be given, the rules and regulations governing what these workers can and can't do will be controlled by the administration.

Now some of these people who have already been trained are permitted, while they are scrubs on the field, to handle medications. But they have been specially trained for this purpose. They are competent and have qualified them-

selves in the eyes of the professional people with whom they work, to do so.

This is not a part of the training in the regional program I was explaining. However, when these people return to their respective hospitals, having received the basic concepts we feel desirable for technical aides, then it behooves each operating room supervisor who takes this aide back into the fold to re-orient her; to determine exactly what she can and can't do; and to assist her to implement the basic concepts she has learned. She is not a proficient person after the five-week period. She has a great deal to learn.

Individual differences must be considered. For instance, in one hospital, a year after the training program, two of our surgical technical aides are serving in vital roles. One is an excellent scrub assistant and has taken on many responsibilities. The other is a plodder who is less skillful but who still achieves our objectives. It is an individual thing. Regarding sponge counts (a controversial issue) some administrators say, "Our technical aides will *not* take sponge counts." That is their prerogative. We cannot tell administrators what aides can and cannot do. But we hope that, through a planned training program they will be equipped to do as much in terms of augmenting nursing service and improving it, as each administrator deems advisable.

Q. While we're on the subject of aides or technicians giving stimulants—from a legal standpoint, if something goes wrong, society may charge, "Did the administration foresee that this particular individual is capable of giving stimulants?" If something goes wrong, who would be held responsible?

MISS GINSBERG: The hospital, legally.

DR. COLLINS: I think that's a very important question. I'd like to take issue with the use of aides in selecting perhaps the particular ampoule or the stimulant, or epinephrine or procaine or what have you.

First of all, there are some very practical scientific problems involved. I consider the registered nurse capable of administering metrazol or caffeine or epinephrine to a patient under direction of a physician, but certainly not an aide. I am opposed to technicians and aides even selecting these ampoules.

ANESTHETIST RESPONSIBLE

I feel, furthermore, that there is a responsible person in the operating room. You bring up the question of giving epinephrine and stimulants that may not necessarily be the drug selected by a surgeon. The anesthetist is more likely to be the one who desires to give a medication. Procaine intravenously is frequently selected by the anesthetist, as are other drugs.

Now here is a physician whose prerogative and responsibility in the operating room is the management of medical problems, of resuscitation, or the control of physiology of the patient, whereas the surgeon confines himself to a large measure, and devotes his energy to the restoration of anatomical continuity.

There's one other aspect to this problem. In the state of New York, for example, anyone other than a physician cannot give legally any intravenous fluids or any other

medication. A nurse cannot give an I.V. nor any kind of I.V. drugs in this state. In whatever state you are working out programs, it is important to determine their legality. Also, I might further point out, in the operating room the well-trained anesthetist is responsible for the control of a diabetic state, and therefore he is frequently using insulin. He will perhaps request a technical aide or a registered nurse to prepare a medication for him, but from then on it's his responsibility to administer the drug, and to check the label and the dose.

In more and more institutions the present philosophy of anesthesia is that we are private practitioners, and therefore we are not responsible to the hospital, we are responsible to the patient. And our malpractice insurance covers us for this responsibility.

DR. HURWITT: It seems to me that the basic problem that is being faced, or for which a solution is being sought, is how to augment the efficiency of adequate numbers of registered nurses in all areas—and that this area of operating room technicians, or adequate number of nurses in the operating room, is really just part of the general problem.

As a solution to this problem, I think the technical aide, or nursing technician, has been improvised and has proven, despite theoretical objections and with some enthusiastic support, to be a logical way of meeting the problem at this time. I think that what many of you are afraid of—some of you will voice this fear and others perhaps will repress it a little bit—is that the technician may supplant you. And if this is the issue I'd put the issue squarely on the table. Let me augment this by stating what compromise we have reached at the Montefiore Hospital, where we do have an operating room technicians' training course in which we receive practical nursing graduates from our own practical nursing training program.

R.N. ALWAYS OVER TECHNICIAN

We have never turned over the responsibility to an operating room technician. We have operating room technicians who instrumenteer on minor cases, and as they establish themselves as being capable they instrumenteer on major cases. But a technician is not the senior nurse in any case, under any circumstances. There's always an R.N. who is responsible for every move that this P.N. or technician makes, just as the surgeon of record is responsible for any move that a resident or an intern makes whom he has under instruction. And for those of you who fear that your positions are being jeopardized by this relatively recent development, I take an entirely opposite point of view. I claim that your positions are being strengthened by having this kind of technical supplementation to your work so that you can be freed from some of these more menial tasks, for tasks that are more commensurate with your training and ability.

MISS GIFFIN: I sense a great feeling of insecurity on your part about the technical aide. You ask, "What should their aid be?" "Can we keep them out of the operating room?" "We do it because we want to, why should we have them?" "Should they take call?" "What about their taking away the student nurse's scrub?" "What is their relationship to the practical nurse?" "What should their salary be in relation to that of the graduate nurse?"

MISS GINSBERG: I am extremely sensitive to your complex problems. These same issues have been faced in many places throughout the country. I am pleased that you are sufficiently interested in the subject to explore it further.

At the risk of seeming repetitious, the surgical technical aide is *not* designed to replace you! She is designed to help you. Her wage scale will vary from state to state, depending upon what the traffic will bear. Obviously, it would have to be somewhere below the practical nurse's salary. As the wage scales are set up, the professional nurse would have the top salary, the practical nurse less, and the surgical technical aide below that. And no matter how good the surgical technical aide, you can see the obvious problems should it be decided that she is worth as much as the R.N. and she should be paid commensurate to the R.N. in salary. That would be a very sad mistake.

The surgical technical aide—in answer to this question—should, in no instance, *ever* be considered for the position of operating room supervisor or assistant operating room supervisor. She must constantly work under continuous and direct supervision!

This question goes back to the statement I made earlier, regarding our doing well the things that we are accustomed to, and every human being's reluctance to change. Apparently the questioner does not feel as I do about a professional nurse's being able to take care of emotional and physical needs of a patient in an operating room. You were challenged with the question: What nursing is done in passing instruments? There was no answer. I am the last person to tell hospital administrators that they have to *have* surgical technical aides. Again, this idea evolved as an outgrowth of need. If you have qualified registered nurses who are happy, productive people in the operating room, no one would recommend that you throw them off your staff and get aides. That certainly wouldn't do. Surgical technical aides were developed to meet the needs of hospitals that do not have such well-equipped staffs.

Where and when can the aides do the kinds of things that they are helped to learn to do? Each of us cannot accomplish as much as the next fellow. I can grow just so far. If you are a good supervisor, you will have to help me grow to my maximum potential, so that I will be a more productive human being, and in being a more productive human being I will be a happier person and make a better contribution to you.

I think how much the aides can do depends upon the individuals. In one hospital I know of, one of the surgical technical aides is a gem. She is most proficient. The other one, trained in the same program and given subsequently the same amount of guidance and supervision—if anything, a little more, will never reach the level of achievement of the first one.

WHY DOES SHORTAGE EXIST?

No studies have been made on why the shortage of operating room nurses exists. I think that the shortage of qualified operating room nurses in the country today is caused by the fact that we have not in the past given adequate instruction to basic students to motivate them to want to go into operating room nursing. And then for years we have had the traditional concept of teaching, which is "telling." You do it because I say so. This is the

way, this unquestioning attitude! Obviously as professional nurses you are privileged to go into any area and specialization you want. Unless you are motivated in your basic program to want this area of specialization, you will not seek out this field. For this reason I do not feel as some of my colleagues do—that operating room nursing should be taken out of the basic curriculum. Instead, we should work diligently to improve it.

In institutions that I know of, the surgical technical aide *does* take call with a graduate nurse. She *does* get paid for the call she takes. She does *not* take call alone.

In all instances, within my experience, after adequate interpretation, the doctor's reaction to the technical aide is a satisfactory one. But this doesn't come by osmosis —it must be explained and discussed!

MISS GIFFIN: I don't think we can leave this subject until we have explored the traditions within the Nurse Practice Act and in the Medical Practice Act for using unlicensed nursing personnel in certain states. Mother Alice, as an administrator, I'm sure you are very aware of that responsibility.

MOTHER ALICE: I feel that it is the responsibility of the hospital administrator to see that there are well-trained personnel in the operating room where major surgery is performed and life and death at stake. I am sure the surgeon would feel a great deal of anxiety if he thought he did not have adequate and capable assistants. In our operating room we have a professional nurse as scrub nurse, and, if possible, one who understands the special technic of the operator; also a circulating nurse.

There is a place for a technician or practical nurse who could work between two rooms helping the circulating nurse, removing linen, sterilizing instruments, and doing many other such duties.

Stimulants are usually ordered by the anesthetist, prepared by the circulating nurse, and administered by either one.

MISS ROBERTS: I think maybe instead of looking at the "shoulds"—what should happen—it might help in retrospect to think what has been happening over the years to nursing.

Our definition of nursing in our medical practice today is quite different than it was even 30 years ago. In intravenous therapy the schools of nursing in this state are now required to teach student nurses to give intravenous infusions—not medications but infusions. Even lay people are being trained to do this in case of atomic disaster. Things are changing much more rapidly than they did 30 years ago. Even in—well, half of 30 years ago, when I was a student, there were chiefly student nurses around. Under situations I went into shortly after I graduated, the students, staff, or head nurses, weren't qualified to stay in some places.

On the other hand, today we know practical nurses are being left in charge of wards, even in the busy daytime, and quite frequently at night, when things are quieter, so we cannot, all told, set up a lot of "shoulds" and then try to meet them. We have to say, "How did things come to change?" And they have to change because needs are presented. Miss Ginsberg, could you estimate how many operating room technicians or operating room aides there are in the country?

MISS GINSBERG: No. I know that many, many hospitals have trained many lay workers and done a very commendable job, without all of this formalized plan that our program suggests. They used the apprenticeship system which has merit. Ours is an organized course which we believe is more effective.

MISS GIFFIN: Would you say, though, that these many would perhaps be 10,000?

MISS GINSBERG: I have no way of judging. I would have a hunch it's much below a thousand, all over the country.

Q. Miss Ginsberg, do you believe that a technical aide in the operating room should be taught nursing ethics?

MISS GINSBERG: See page 1 of the Manual. I think we begin with four hours of ethics, not only nursing ethics, but hospital ethics, medical ethics, and so on. That's such an important part of the program that it is at the beginning.

MISS GIFFIN: To summarize, the increased demand for nursing service has outrun the ability of our schools of nursing to produce graduate registered nurses, and for perhaps that initial reason there came into the hospitals a group of people who had not that amount of training, some of them being trained on the job, some of them having organized courses of instruction, such as the one with which Miss Ginsberg is concerned.

Everything in medicine is moving so fast that in some states our laws have not been able to keep up with our practice. We must obey the laws of the states in which we are, but we will work together to have them changed when they do not meet our needs. Some of you approve of the technical aide, some of you are frightened of her, but all of you are very interested.

Q. If you sterilize the barrel and plunger of a syringe together, as one unit, is the syringe sterile? Which method do you prefer — the parts together or separated?

MR. PERKINS: The basic principle involved in moist heat sterilization is direct contact of saturated steam with all surfaces. In order to be assured that such direct contact with all surfaces shall take place, it is necessary to disassemble the syringe prior to sterilization, or else just before placing the syringe in the sterilizer, the barrel and plunger should be rinsed with distilled water, leaving the parts moist, and then assembled. During sterilization this small amount of moisture will then furnish sufficient steam for direct contact with all inner surfaces of an assembled syringe. *(ED. NOTE: This, however, is not considered a safe technic, because the moisture in the syringe leaches out chemicals from the glass, which in turn inactivates many drugs which the syringe ultimately contacts.)*

I might add that probably a good many people have attempted to prove that you can sterilize an assembled syringe without taking the precaution of rinsing it with water just prior to placing it in the sterilizer. I'm sure that with certain organisms as controls they have been able to show that they have attained sterility, but I'm not at all sure that Dr. Spaulding or I would agree that most of those tests have been carried out under properly controlled conditions, using resistant organisms of known heat resistance and known populations.

(ED. NOTE: Syringes can be sterilized assembled using dry heat. See "Severe Dermatitis Is Eliminated by Complete Removal of Residual Drugs from Syringes," HOSPITAL TOPICS, February, 1954.)

Q. How would you recommend that an endotracheal tube be sterilized, Dr. Collins?

DR. COLLINS: There are two ways of doing it. One of course is by autoclaving the tube, which is not, as far as we're concerned, necessarily the preferred way because the tubes are frequently destroyed or softened in the process and are not usable. The way that we have found effective, and which at the same time leaves our equipment in proper condition, is simply soaking or scrubbing our tubes with Zephiran or pHisoHex.

We started doing this about three years ago. Endotracheal tubes for children are an extremely important problem because in children, and only in children, is it necessary to have an absolutely sterile tube. We have had no cases of laryngitis or tracheitis as a result of the simple scrubbing 20 minutes ahead of time of the endotracheal tube. We brush the tubes inside and outside—and after contact with pHisoHex or G-11 and water, tubes have been submitted to bacteriological tests, and we have been unable to grow any colonies of bacteria. So that's our recommended procedure.

In tuberculosis cases, where endotracheal tubes are used, there's a solution that has been recommended and used by Dr. Livingston in Chicago. It has an alcohol base in it and I think formaldehyde in a very low percentage, and in one hour the tubes are perfectly useful again for other cases.

DR. SPAULDING: Is it tuberculocidal?

DR. COLLINS: Yes, Dr. Livingston's solution is tuberculocidal. We haven't had enough tuberculosis cases in which we have attempted to clean our tubes with pHisoHex to determine whether or not we could culture the tubercle bacillus.

DR. SPAULDING: I think the problem here is not those cases that we know are tuberculosis, but the cases that we do not know are tuberculosis.

DR. COLLINS: The answer to that is very simple, because if we're going to have an unsuspected case of tuberculosis in the operating room, a lot more things are going to be contaminated than an endotracheal tube. When a patient has the tubercle bacillus in his respiratory tract, the possibility of cross-infection is very definite. It doesn't require such close association as an endotracheal tube. Our masks, the linen towels, and everything else that might be employed in the operating room tend to become contaminated.

As you know, at tuberculosis sanitaria we prefer to wear masks, and we have our patients come to the operating room wearing masks, even though they had a negative sputum.

DR. SPAULDING: There is considerable evidence to suggest that alcohol, either ethyl or isopropyl, in concentrations of 70 to 95 percent, is an effective tuberculocide. On the other hand, there is reasonable agreement that cationic detergents are lacking in such properties. The solutions of the phenolic-lysol-cresolic type, I think, have considerable tuberculocidal activity. I am not quite sure about aqueous formaldehyde. In-

stead of trying to pick out one solution, I wonder if we couldn't agree on certain kinds of chemicals which positively do have tuberculocidal activity. I suggested alcohol, alcohol-formalin, and the cresol-type compounds. Perhaps there are others, I'm not sure. There aren't very many. Dr. Collins has made one definite suggestion; I'll make another. If your endotracheal tubes are plastic materials that will stand alcohol immersion, I suggest it, preferably with formaldehyde or something else added. We know that formaldehyde-alcohol combinations are rapidly effective.

DR. COLLINS: As far as we're concerned in anesthesiology, this is a relatively settled problem. The investigations were carried out in Chicago by Dr. Livingston. About seven different methods existing at that time were considered to have bacteriocidal and tuberculocidal activity. According to the report which Dr. Livingston made, the sum and substance of which is recorded in *Surgery* (Vol. 9, p. 433, March, 1941) the use of alcohol as a vehicle containing the formaldehyde and phenol in small percentages has been found satisfactory by repeat tests in many tuberculosis clinics. The problem of subsequent burns of the face is also minimized, since the concentration of formaldehyde is low, yet effective.

DR. SPAULDING: In view of the technics and procedures that have become available in the last five years, much of the older information is no longer valid, whether it be favorable or unfavorable. I am not detracting from Dr. Collins' analysis of the ingredients of his solution, but we must remember that there has been a definite improvement in the evaluation of tuberculocidal materials in the last few years. Some of the technical improvements make some of the old material out of date.

MISS GINSBERG: In the case of tuberculosis, as in the case of gas gangrene, it is not considered necessary to close down a room. I do feel, however, that the cleaning up procedure used after cases should not vary. The technic should be to clean a room after a "clean" case just as conscientiously as you clean a room after a "dirty" case.

It has been proved—and we have competent experts here on all sides—that aeration of the room is not going to kill the tubercle bacillus, if it is aerated for 48 hours! The procedure that we teach in New England is to collect all contaminated linen (and that which was opened but unused) in a laundry bag and place it in an autoclave for 30 minutes at 250 degrees. Instruments are unlocked and placed directly in a washer-sterilizer, or, if such equipment is lacking, are immersed in a detergent solution and placed in the steam sterilizer for 30 minutes at 250° F. Why clean the ceilings? Why do the walls? There is a circumscribed area of contamination, and no one would deliberately wipe the walls with wound drainage.

Q. What solutions are you going to use to wash furniture and material that has been contaminated with tubercle bacilli?

MISS GINSBERG: In many hospitals, we are not recognizing that the quaternary ammonium salts which are used abundantly and perhaps rather promiscuously

would not be effective in destroying the tubercle bacillus. Alcohol is considered a good agent. I think, however, we must never underestimate the value of soap, water, and elbow grease. I don't believe that a quick wash over anything is any good. I think we really have to use mechanical friction on these areas, and scrub them down with soap and water followed by an alcohol wipe-down. If someone can suggest a better procedure or a new chemical that would do exactly what I'm trying to explain, we'd be happy to learn about it.

DR. SPAULDING: In most textbooks you'll read the statement that the tried and true tuberculocide is Lysol or cresol. There is, I think, good reason for this attitude. More recently less odorous compounds have come out, O-syl and Amphyl, for example, which unquestionably have tuberculocidal action. I think that these would be highly acceptable from the bacteriological point of view. There are probably others.

Q. What is the effect of ultraviolet light after a dirty case?

MR. PERKINS: Personally, I would not recommend it. Ultraviolet energy is not effective in penetrating organic matter to any appreciable depth. I think that's been proven and is part of the evidence in medical literature.

DR. SPAULDING: May I pick that up? You see, the organism is going to be destroyed by ultraviolet radiation only if the energy particle strikes the organism—in other words, if the organism is in the path of the radiation. It is very difficult to get complete coverage of areas that have to be "disinfected" or irradiated. So I think we're led to the conclusion that the ultraviolet ray may have some possibilities but not so many as we thought a few years ago.

Q. What is the effect of chemicals on furniture, since chemicals are not in close contact with it for a given number of minutes?

DR. SPAULDING: Chemicals such as Lysol, for example, are not volatile and so do not disappear immediately, but this deposit remains active until thoroughly dry and perhaps a little longer. I am not aware that cresolic compounds are damaging to furniture. I would think this is not a disadvantage with the usual kinds of disinfectants. Alcohol for this purpose is volatile, and damaging to some types of furniture, but I shouldn't think there would be any question about Lysol.

MISS GIFFIN: Let's have a change in pace. Miss Roberts, could arrangements be provided to enable operating room nurses to follow up on the postoperative program of different patients, when their schedules permit?

MISS ROBERTS: I think it would be good to provide for postoperative follow-up not only for the student but for preoperative inspection—seeing the patient and knowing the patient *before* a surgical procedure is performed. I think it pays if such arrangements can be made for the students and if graduate nurses get interested in other than the technical procedure. I'm not an anesthetist, but I know many anesthetists who

have done splendid work in preoperative work in the care of the patient and in following through into their postoperative care. I would like to see nurses join up with this group and begin seeing the whole care of surgical patients, total care rather than only the technical procedure.

DR. COLLINS: I think that a recent aspect of operating on patients that will directly affect this question is the development of the recovery suite, which is properly placed in continuity with the operating room. The greatest obstacle to you nurses in finding out what has happened to the surgical patients is space. When you get through operating at the end of the day, or before the day starts, the postoperative patient is usually so far away from the operating room where you're working that it's difficult and inconvenient for you to get up there. But if a recovery suite has been set up for the management of the postoperative patient during his acute phase when his vital signs are becoming stabilized, and this recovery suite is part of the operating suite geographically, the natural thing will be for nurses to gravitate into the recovery suite and see what's happening to the patient. This is exactly what is going on in our hospital.

MISS ROBERTS: I'm afraid I'd go into something a little broader than that. While the patient is in the recovery room, he's still not a person. He's still the result of the surgical and anesthetizing procedure. He's unconscious. We don't know what's really going to happen to him as he returns to the home, and what adjustments he's going to have to make as a result of that surgical procedure. He may need help even after he leaves the hospital. I think operating room nurses are rather in danger of becoming so focused on technical skills that many of the same things might be happening to us that happen to men on the machine assembly line who turn the same screw day after day.

DR. COLLINS: I would like to call for a partial panacea to this problem. I think the anesthesia department has a little gimmick here. We do preoperative rounds and we'd like to take any or all of you nurses around to see the patients.

VOICE FROM AUDIENCE: The hospital where I'm working has made arrangements for all nurses to attend surgical grand rounds with the complete surgical staff once a week. Operating is stopped for one morning. More and more individuals are coming in, and the staff is very agreeable to that. And besides making ward rounds and seeing what happens to our patients, we have conferences. Pathological slides are shown, and the whole operating room staff attends. We see what happens to our patients, postoperatively.

DR. COLLINS: I'm sure most surgeons are concerned about our student nurses. We're trying to work out a rotation plan to give them exposure and training in the operating room earlier in their career, so that they get basic principles. Then we permit those students who think they are interested in specializing, to return to the operating room for a more detailed expe-

rience—and not make it a requisite for all students to return to the operating room.

Q. Dr. Hurwitt, how can doctors be made to observe correct technic?*

DR. HURWITT: I wish I knew the answer to that. We are confronted by this problem, I am sure, just as often as every one of you is. I know of no way of compelling someone to do something simply because it's the "right" thing to do. You're dealing with adults—perhaps not emotionally adults but chronologically adults. And they've all been exposed to the same teachings you've had. They've all been shown from A to Z how to put on a scrub suit; how to roll up their sleeves; how to put on caps and mask; how to cover their noses; how to scrub; how to dry their hands and how to put on a gown; how to put on gloves; how to avoid contaminating themselves while draping the patient; how to avoid contaminating the scrub nurse—and all the way down the line.

But I don't know of a single hospital I've visited in which I haven't seen a surgeon operating with his mask down around his upper lip somewhere. I guess the custom of operating without gloves is almost gone, but when I was at the Massachusetts General Hospital "a half of 30 years ago" there were still one or two men who wouldn't wear gloves. Now in Philadelphia there are surgeons who don't wear gloves when working within the heart—for a very good reason—so as not to catch the rubber of a glove with a needle

*See letter to editor of Annals of Surgery, reprinted on page 124. —ED.

inside the heart, but what does that do to accepted technic? It's a breach of what we understand to be accepted technic. And I don't know of any way really to compel people. You can teach them; you can bar the worst offenders from the operating room. But I'm sure the question is not directed to the flagrant violator, the question is directed to people who day in and day out will keep their masks up and who do observe these little things. And I have to confess, I would like to know the answer.

Q. Dr. Collins, can the anesthetist follow his own technic, or should he conform to those that are being used in the operating room?

DR. COLLINS: He should conform to standard O.R. technics and conduct. I support Dr. Hurwitt very thoroughly in saying that we would like to know a way of enforcing certain regulations—sterile technic and conduct, as well as a lot of other things. But I think part of the problem goes back to medical school. Medical students, before they become interns, fall into bad habits because they've never been exposed to very simple good procedures of aseptic technic. That's a truism—despite all the glory that tends to be thrown around medical schools. No one takes time out to show them the difference, for example, between the kinds of instruments, and their names.

Anesthetists are a very vital part of the operating room, and I personally am a very strong believer in proper conduct, sterile technic, and everything else. I feel that it is as important for the anesthetist to observe the "back-to-back" technic as it is for any

other person on the operating team. Yet I see it flagrantly violated by the residents on the surgical services, as well as anesthetists, not in our hospital alone but in every other hospital I've visited.

It's a very frustrating problem, because you can't teach your student nurses properly if they see the doctors violating principles.

DR. HURWITT: There are two or three very simple things that I think could be done to improve the whole area. The "back-to-back" technic, as Dr. Collins suggested, is excellent, but I would like to suggest a more widespread use of the type of gown we use at Montefiore Hospital. It has a sterile back, and this was re-emphasized in my mind when I went to one hospital a couple of weeks ago and saw the scrub nurse still draping towels on the doctors' backs.

Here is another thing I think is very important. Often a break in technic may be completely unnoticed by anyone in the room except the scrub nurse, the circulating nurse, or the nursing technician. It is the moral responsibility and obligation of that person to announce immediately a break in technic. This is not only an ethical responsibility but a responsibility to the patient. The patient's safety may be, and has been, jeopardized under circumstances where a break in technic has occurred. Something as simple as an improperly placed towel can result in serious infection and is the responsibility of the person who didn't call it to the attention of the physician at the time it occurred and this goes right back to you girls.

MISS GINSBERG: I think operating room nurses represent the most appreciated, and yet the most maligned employees in the hospital. I think we have a very, very important job to perform. However, I feel that we are not without faults ourselves. And before we have any right to point accusing fingers at somebody else, we have to improve ourselves.

I think that in years gone by, we as nurses—with all due respect to tradition—have assumed a role of subservience to other members of the operating room team. I think we have not been trained sufficiently or adequately in the ability to use what intestinal fortitude we have to support a point of view. We have permitted ourselves to be led by honorable members of the medical profession who, in good faith, have had to take the lead because we were not capable of doing so.

The more we know, the more secure we feel in our jobs, the better able we are to interpret problems. But we must grow sufficiently to be able to sit down and discuss problems intelligently, without fear, in an atmosphere that is exceedingly permissive, with doctors whom we admire and with whom we would like to work—and notice I said work *with*, not for—we are their colleagues. We have something to teach them, and they have something to teach us. It's a cooperative deal.

In places where this problem has been acute, the answer has been found — but not overnight — in the development of surgical technic committees. The technic committees are worth absolutely nothing if the nurses represented in the group feel that "Dr. Jones knows so much more than I do. He's the chief of the surgeons

and if he says so it's got to be so." You've got to have the courage, willingness and ability to support a point of view. You can create a reasonable relationship with doctors when you sit down with representation of all the disciplines to discuss problems of mutual concern. If you'll put your problems on the table, I have yet to find a doctor who will not sit down and listen, who will not offer his cooperation if you are strong enough to make a reasonable suggestion.

Q. Is there a firm foundation for some surgeons' preference of iodine 3.5 percent and alcohol 95 percent as a skin disinfectant rather than mercurial preparations such as Merthiolate and ether?

DR. HURWITT: I think that iodine 3½ percent is better than iodine 7 percent. Iodine 7 percent by the time it's used often creates irritation, particularly around the edges of the field. I think a half-strength iodine is just as good as any of the mercurial antiseptics or the antiseptics that are loaded with detergents or the other so-called more powerful antiseptics.

My own personal feeling is that the mechanical scrub of the patient's skin, the scrubbing of the skin with soap and water, is far more important than all the antiseptics in the world put together. From my point of view, if the patient is adequately and thoroughly scrubbed—and I'd like to stress those words adequately and thoroughly—not just a whisk and a promise—I think then that the paint has as its major service the demarcation of the area to confine within sterile towels. And if you can visualize the area that you have scrubbed, you probably could do almost as well using an aqueous or colorless final solution as you do with the paint.

Fortunately, the paint for the most part does no harm; it probably does keep down the skin contamination for the first part of the procedure, and does help the surgeon in placing his drapes and towels. But by the time the procedure has gone on for any length of time, skin cultures will show a growth of organisms that have come out from the pores regardless of whether Lysol compounds, half-strength iodine, mercurial compounds, or anything else is used.

Q. Dr. Spaulding, is it necessary to rinse with an antiseptic, following a hand scrub with soap containing G-11?

DR. SPAULDING: That's a very important question, but first a comment on what Dr. Hurwitt said. He believes that iodine antiseptic would be as efficient as mercurochrome. I think this is extreme conservatism. Iodine is a great deal better, because it is bactericidal and the other is not. Mercurials have very little bactericidal activity compared with iodine. Half-strength iodine is still 3½ percent, which is 1 to 30. And we talk about 1 to 1000 solution with mercurials and many other antiseptics. I think a critical experiment would be a comparison of 1 to 1000 iodine and 1 to 1000 Zephiran. I have done some of these tests, and iodine did have activity in high dilution. We talk about iodine burns. I wonder if iodine hasn't suffered from being used in too great concentration. We have not appreciated how active iodine can be.

As for the other question—should we use a rinse

following a hand scrub with G-11—you might infer that G-11 is not an antiseptic. Mechanical action is extremely important. On the other hand, let's not lose sight of the fact that the incorporation of certain products—I think G-11 is one of them—in soap does give an antiseptic action, and it is a lasting, residual one, a carry-over effect. It is true that, using G-11 for the first time, and using only a simple application of it for a surgical scrub or skin prep, is not effective. It is not that good.

G-11 is water-insoluble, and it leaves a deposit on the skin which exerts a continuous action. And so we get a carry-over effect which is something more than a mechanical effect. This point is related to the question: Do you rinse in an antiseptic afterwards? One thing you don't do is to rinse in an alcohol dip, for the simple reason that G-11 is soluble in alcohol, and you therefore remove the residual G-11. If you use a G-11 soap in order to get the carry-over effect and then rinse your hands in alcohol, you have destroyed the purpose for using G-11. And so I suppose the answer to this would be "No." My own impression is that alcohol is one of the best antiseptics.

MISS GINSBERG: In dealing with nurses and doctors in many hospitals throughout the country, I have found that doctors, like nurses and other human beings, are rather resistant to change. I recognize that we have to be practical in dealing with the problems that come up in our day-to-day existence. I know of many doctors who for 99 years have scrubbed in soap and water, and then dipped! And if you move heaven and earth, they will not change! They have to have a dip! Is it not true, that 1:1000 solution of any quaternary ammonium compound will do no harm, in terms of removing the residual hexachlorophene on the skin? For those doctors that have to have the dip, that's the way I would solve the problem. As long as they think they can use Zephiran, they're satisfied.

DR. HURWITT: I think those that have to "dip" can be given the dip. We could go back a little further, though, and see if the enthusiasts for G-11 feel that doctors and nurses don't have to scrub! There's nothing that infuriates me more than to see a scrub nurse a little bit late for her case, or an intern or anybody else, fly into the scrub sink and inside of 25 seconds be in the room putting on a gown and gloves. And don't any of you nod your heads and say this doesn't happen in your hospital, because I'm sure it does. One of the major selling points for the G-11 compounds and many of these other fast-acting detergent germicides has been speed. Perhaps you think you can get another drag on that cigarette or another swallow of that cup of coffee and still get to the case on time if you use a fast scrub.

I've thrown many people out of the operating room who have come in with one of these fast, super scrubs, that I don't think are scrubs at all. I think they are terribly dangerous, and I think the cleaning aspect of the detergents has been tremendously overrated and overplayed. I would prefer to insist that everybody scrub 10 minutes with G-11 than have people come in after 10 seconds with G-11.

CARL W. WALTER, M.D. (speaking from audience): I think what we need to solve this problem are facts. The facts concern the anatomic and bacteriologic condition of the skin of the individual when he enters the scrub room. If the person involved has been careful about his daily care; if he uses G-11 throughout the day; if he avoids contamination with dangerous organisms; if he does not have a respiratory infection; if he avoids changing tires; contaminating the skin in the workshop; fixing the kid's model railroad; playing with a dog, and monkeying around with the garbage—he's perfectly safe, each time he comes to the operating room, to brush his skin with nine strokes of a nylon bristle brush with a detergent containing G-11, and go into the operating room—bacteriologically as safe as anyone can make him.

On the other hand, this is rather an esthetic type of life which very few surgeons can live. Therefore, we find that most of them had better take a more active course; scrub their hands for 90 seconds and then go through a germicide that is known to be active on the dirt which very few of us eradicate thoroughly during a scrub. This means that they have to have a germicide which is a detergent as well to help penetrate this dirt.

Then we have the surgeon who scrubs only every 10 days. The bacterial flora on his skin have had an opportunity to completely re-establish themselves. He has to scrub 30 strokes to all areas of the skin with 50 strokes to the nail, and may spend 15 minutes getting down to the place of the person who scrubs daily, insofar as safe, clean skin and bacterial count are concerned. This man is more dangerous than the surgeon who comes in every day; this man is more dangerous than the nurse who comes in every day and spends 25 seconds, as Dr. Hurwitt described, getting into a case and not being late. So I think we have to abandon time as a factor in scrubbing; we have to abandon all these concepts of the past and rely upon good detergency, active germicide, and a keen analysis of the facts pertaining to the individual skin at the time the remedy is applied.

I'd like to make just one more comment on a previous question on how to get the staff to cooperate with these technics. I think you have to take a lesson from the Presbyterian Hospital here in New York. Someone there in the early 30's was confronted with this problem. He did postoperative studies, he gathered numbers. How many patients got infected? Technic talks for itself when you have to add up infections every month, month by month. Then the staff will gradually see whose cases are infected; what good results are; what bad results are. No pedagogic exercise such as you describe does any good unless it has some compulsion and some facts with it to make people think and add up end results, and not just get emotional satisfaction from prying into a single case — usually a successful one.

Q. Doesn't there have to be, administratively speaking, a standard, because it is so difficult to judge what has been the previous contamination of a person coming into the operating room?

DR. HURWITT: This is really a basic question that I have jotted down here to bring up at the end, but I

think this is a good time to take it up. Dr. Walter's work on this subject is internationally accepted as outstandingly good, and there's no question about its validity. But he is in a high-powered atmosphere—back at the hub of the universe—and I do think that we have to gear ourselves perhaps to the pace of a Ford rather than a Cadillac, because we're not all in the Cadillac class. This comes right down to a standard, simplest technic, and Miss Roberts and others of you who are in the administrative aspect of nursing have stressed this again and again—the need for simplicity in organization.

I don't intend this as a dig at Dr. Walter or Dr. Brigham or anyone else, because I would like to be able to adopt this as a standard, but I know that in our hospital we would not be clean in 90 seconds.

I do agree completely that there should be a standard scrub. If detergents are used—and I guess there are few hospitals today that don't use detergents—then let us set three minutes, which I think nobody will say will damage your hands and everybody will agree will clean up all your bugs. Let's set this or something like this as a standard and make everybody conform to it — the person who scrubbed the day before as well as the person who scrubbed the week before, and the person who played with the dog and took care of the child or baby's diapers before he came to work — with the exception of the nurse or doctor who has gone from one case to another, who's really very clean and can take a shorter scrub.

DR. COLLINS: I believe that in carrying out operating room procedures, personnel should not be allowed to be guided by their consciences. Certain standard operating procedures must be set up. In the Army we saw just soap, water, and a brush used for 10 minutes by the clock. It was perfectly adequate, and few or no infections resulted out in the field.

MISS ROBERTS: I think the nursing service administrator might be very helpful here, in seeing that standard operating room procedures are, or can be, maintained.

I do not think the operating room supervisor should be given the burden of trying to discipline a surgeon. I think she has the responsibility of calling his attention to the procedures maybe once or twice, and then referring the matter to the nursing service administration, who can then refer it to the surgeon's colleagues on the committee to maintain operating room discipline. It's much more effective to have his own colleagues intervene.

Q. To whom is the operating room supervisor directly responsible?

MISS CONDON: We are responsible to the graduate school of nursing and to the surgeon, and to the associate director of nurses, who helps solve many of our problems. She in turn brings out problems to the director of the school. There they are solved and acted upon as she sees fit, and they go to the medical director.

Q. For what things, to what person, is the operating room supervisor directly responsible?

MISS GINSBERG: It's a very real problem, and one that is causing increasing concern throughout the coun-

try. In some hospitals there has already been a change making the operating room supervisor directly responsible to the administrator. I am in no position to say whether this trend is good or not.

In the hospitals in which this has evolved, the hours of work and the interaction between personnel seem to have improved. However, the plan is still in its embryonic stage. I cannot say at this point that it is the answer. I feel that as nurses, working in a hospital situation, we belong under the jurisdiction of the director of nursing service.

In most instances of which I am aware, the reason for the shift of control from the nursing administrator to the hospital administrator has been the poor interaction between the operating room supervisor and the director of nursing service.

If that's the answer, perhaps the change is all right. I'm sufficiently malleable to say that if it is going to improve the quality of care and the stature of nursing —which I doubt—I'm all for it.

MISS ROBERTS: I think a trend which puts another side to the question is the trend for the nursing service administrator to be considered on the same level in the hospital organization with other assistant directors, not other department heads. This is particularly true in the larger hospitals, so that the well-prepared nursing service administrator has a closer liaison with hospital administration than she probably has had in the past.

We are getting many more effectively prepared nursing service administrators, who, I am sure, will be more capable and helpful.

MOTHER M. ALICE: We have in our hospital an operating room committee composed of the directors of surgery, obstetrics and gynecology, and anesthesia, together with the operating room supervisor. This committee holds monthly meetings. When they have serious problems or when they are looking for new equipment, I am invited to be present. Every man is free to express his own opinion and make known his problems.

As you know, there are many changes in technic, apparatus, etc., but the attending surgeons confer with their chiefs, solving difficulties at these meetings.

Complaints regarding nursing personnel in the operating room are and should be referred to the operating room supervisor, who usually makes the necessary corrections or changes herself, or with the advice of the director of nursing or her assistant.

We have a very busy operating room, because we have many emergency operations and have a large ambulance service. Cooperation from all is necessary.

Our operating room nurses have always been more than cooperative, and each seems to work compatibly with the other. We have our problems, as do all operating rooms, but the atmosphere in the operating room has always been a good one, and this, I feel, is due to the personnel.

Q. Do you use such a committee, Miss Condon?

MISS CONDON: We are planning now to form a committee in our school of nursing, and we feel that it will help solve some of the problems that arise in the operating room.

DR. COLLINS: I think this ties into the previous

question. I believe the operating room supervisor should be a department head. I think she has two types of responsibilities—administrative responsibilities and functional, practical responsibilities. I believe she should be a full-fledged, voting member of an operating room committee.

In many places we've rather lost sight of the fact that hospitals exist as workshops for doctors to treat patients, and that eventually all the decisions of "how best to treat the patient" must, of course, come into line with medical thinking. Therefore, in essence, the operating room supervisor or department head, as a member of the operating room committee, actually has an opportunity to be kept posted on new developments in various surgical specialties.

The operating room committee, as Mother Alice noted, should be made up of at least six different people: the directors of the surgical specialties, the director of anesthesia, and the hospital administrator. Unquestionably the director, or departmental head of the operating room nurses must be a member of that committee.

I said the operating room supervisor has administrative and functional responsibilities. Now from the administrative standpoint there could be, and in our hospital there is, a joint administrative-executive conference held once a month, at which the directors of the various nursing services meet with directors of the medical services and present their administrative problems, such as pay, job satisfaction, security, and everything relating to responsibility.

Incidentally, I'd like to make a very important point to emphasize to hospital administrators and others in your various bailiwicks: If you are to assume responsibility, then you should be given authority with it. If you don't have authority to act, there's no sense in having responsibility. It is frustrating.

Q. In institutions in which the operating room supervisor is responsible to the hospital administration, who is responsible for staffing the operating room? Does the operating room supervisor directly hire and fire?

MISS GINSBERG: Yes.

Q. Couldn't that still be done in the more common pattern we have now, if there is adequate communication between the supervisor and the director of nursing services?

MISS GINSBERG: Regarding the development of this committee, for fear that we would continue our role as isolationists, seeing our department as a complete entity outside of the hospital, I've worked to invite, as participating active members of this committee, representatives of all departments that have to do with surgical aseptic technic. The delivery room and central supply supervisors are invited as members. Certainly their technic and procedures should be the same as those in the operating room; the central supply supervisor has problems of very real concern to operating room personnel. Everybody has to get together and discuss mutual interests. It does no good, I believe, to straighten out an operating room situation when the central supply is in a mess. And the same is true of the delivery room.

Until we reach a point where we can sit down and

talk intelligently, with much light and no heat, to discuss all our problems and put them all on the table and look at them realistically, I don't think we're going to be very successful.

Q. Mr. Perkins, I understand nylon urethral catheters can be autoclaved. What temperature and time would you suggest?

MR. PERKINS: For urethral catheters of nylon, woven base or Latex types, I would recommend a temperature of 250° F. saturated steam for 30 minutes, with the consideration, of course, that they were properly cleaned beforehand. The lumen of the catheter should be moistened before placing it in the sterilizer.

Q. When no other type of sterilizer is available, how long should Vaselinized gauze be autoclaved at 250° F. to be safe for use?

MR. PERKINS: In the event that you have no hot air sterilizer available, there is general agreement that sterilization can be accomplished in the autoclave with steam admitted to the jacket only, maintained at 15-17 pounds pressure or 250°-254° F., and an exposure period of six hours or overnight. The sterilizing time varies with the amount of Vaseline gauze being sterilized at one time. Care must be taken to be sure that water is added to the Vaseline.

Generally speaking, I do not recommend the use of the autoclave as a substitute for the hot-air sterilizer, although I realize that many of the hot-air sterilizers being sold today are lacking in efficiency. From experience I have observed that when the autoclave is used as a substitute for the dry-heat oven for sterilization of Vaseline-impregnated gauze, oils, etc., some spillage frequently occurs, the chamber becomes contaminated with a film of oil, and the air discharge line becomes partially clogged, thus imposing a service problem upon the hospital. I do feel that it is the responsibility of manufacturers to design suitable equipment for dry-heat sterilization. Autoclaves are not made to perform this service efficiently.

Q. How long do you advocate autoclaving cotton and silk sutures?

MR. PERKINS: For 30 minutes at 250° F. saturated steam.

Q. For what length of time are sterile goods considered sterile?

MR. PERKINS: The evidence at hand indicates that sterile supplies placed in clean storage can be considered to remain sterile for at least three weeks. We have been conducting a study during the past two years with one of the local hospitals in Erie (Pa.), in an effort to evaluate the length of time that syringes, for example, wrapped in double-thickness muslin, instead of paper bags, would remain sterile in supposedly clean storage within the central supply department. So far as we have been able to determine, the evidence indicates that either method of packaging will preserve sterility for at *least* three weeks.

Beyond that time, I don't know how we're going to evaluate sterility, because during long periods of storage both the muslin-wrapped packages and the paper

bags become so heavily covered with dust particles which constitute a source of contamination of the cultures, that when the package is opened it is very difficult to determine whether contamination actually gained access to the interior of the package during storage.

Q. Since instruments must be opened before being sterilized in the pressure instrument washer-sterilizer, what is the best method for laying the instruments in the tray or basket to facilitate simple removal?

MR. PERKINS: It is always desirable to place the instruments in the tray with some semblance of order. We have been working on the development of a U-shaped pin on which you can hang or place the jointed instruments, making sure that they are fully opened for effective sterilizing but assembled in an orderly manner. However, various sizes of U-shaped pins are indicated because of the various sizes of hemostats, and this feature is somewhat troublesome. I feel that it is essential that all jointed instruments be unlocked when placed in the sterilizer in order to effectively expose the box locks or joints, which frequently contain dried blood. This method will assure proper sterilization of the instruments.

Q. Dr. Collins, what should be the relationship between anesthesiologist and operating room supervisor in regard to the care and cleaning of anesthesia equipment?

DR. COLLINS: Whenever possible, I believe there should be an anesthetic nurse and a trained technician to care for anesthesia packs, like spinal, and the nerve block sets. I do recognize that if you have the facilities and a very excellent, large central supply it could come under that department. I personally prefer to have an anesthetic nurse as well as a technician taking care of my needles, and being trained specifically to sharpen them.

Q. Would this anesthetic nurse be responsible to you?

DR. COLLINS: Absolutely!

Q. And not to the operating room supervisor?

DR. COLLINS: No relation! This nurse is part and parcel of the department of anesthesia.

Q. What part does the nurse play in the administration of anesthesia and the care of the anesthesia machine? Now I take it that you're not talking about the trained nurse anesthetist.

DR. COLLINS: I definitely feel that there is a place for nurse anesthetists, and there will be for some time to come. I believe, however, they're coming under the jurisdiction in more and more instances of the anesthesiologist, and certainly many of the girls whom I've talked to feel more secure when they can present their problems to the medical anesthesiologist.

As far as the care of the anesthesia machine is concerned, it doesn't make any difference whether a nurse uses it or a doctor uses it—I feel that it's *his obligation* to take care of the machine. I think perhaps the technician engaged in the department can adjust it once a day or once a week or whenever it's necessary, but the immediate, first-echelon care is the responsibility of

the man that uses it. And that means replacing the tanks, making sure the valves work, and all of that. Unless the anesthetist trains a technician to the point where he is a real genius, I feel that the responsibility should not be entrusted to that person.

MISS GIFFIN: We have one more very difficult one that you can answer, I'm sure, Dr. Collins: If cyclopropane is used relatively often by the anesthesia department, which does not insist on conductive shoes on all personnel, or does not believe that they are necessary, what should the operating room supervisor do about it?

DR. COLLINS: You've isolated in the question one anesthetic agent, and that of course is erroneous, because five others are equally as hazardous.

Let us not be complacent about the idea held by many hospital and medical people that if ether is being used, there's no need to think of explosive hazards. In the only two situations in which I personally have been associated—one a fire, and the other an explosion—ether was the agent being used! In the explosion case, the patient died.

The newspapers are very eager to headline operating room explosions. It seems that whenever cyclopropane is involved it makes headlines, but when ether is involved you never hear about it. Yet here in Manhattan two years ago there were three explosions with ether, and only two with cyclopropane. The latter made the newspapers; the others didn't.

Regardless of the anesthetic agents, the proper footgear must be worn.

If it's a matter of flooring, there's a grandfather clause, as you know, in the national fire protection code. It's a simple thing, almost a legal entity. They don't expect you to go change your operating floors tomorrow. But they do expect you at some time in the next 25 years when a floor needs replacing to consider the proper type of conductive flooring. In the meantime there are some precautions to be taken. You can scrub your floors with a solution that contains calcium chloride 4 percent that will make them partially conductive and eliminate partially your electrostatic hazard. And I feel very strongly about personnel wearing only cotton outer clothing, and of course the proper conductive shoes. The anesthetist who feels that conductive footgear is not necessary I consider a mere renegade technician — not a physician or an anesthesiologist.

Q. Is there some place we can write for postgraduate courses in operating room technic? I wrote the (National) League (for Nursing) twice and got no answer.

MISS GIFFIN: I apologize for the League, for not giving an answer. The League does not have a list of postgraduate courses in all specialties, because up until this point there has been no means set up for evaluating the program, and the League does not feel it can take the responsibility of giving lists of programs that it has not been able to evaluate, or that no one has been able to evaluate. Your safest bet is to look for postgraduate courses in connection with university programs.

Q. What is the answer to anesthesia in the small hospital?

DR. COLLINS: Well, of course you can have a part-time physician-anesthesiologist who might come in from a nearby larger institution as consultant and advise on how to proceed. I think it becomes a matter of education of the surgeons. If they recognize what can be furnished by a physician-anesthesiologist, they will demand one. Some man who is finishing his training in anesthesiology may be brought in, and if the setup is attractive, he may stay.

I'd like to go back to another point for one minute. I think that the operating room nurses have certain duties to perform, to help the anesthetist. There are matters of infusion, getting the suction prepared and turned on; seeing that the table is locked; seeing that there's a bucket around. Anesthesiologists expect those things to be furnished and the equipment ready in the operating rooms, such as needles and so on. We are there to use the equipment and to render a professional service to the patient, not to provide equipment.

Q. Dr. Collins, do you have a nurse anesthetist in your hospital?

DR. COLLINS: We don't have a nurse anesthetist in our hospital, for surgical anesthesia, but in the Army I had 11 nurse anesthetists in my department. We had a busy schedule and functioned well. There were three doctors who supervised their work, and we did what is called "trouble-shooting." But I foresee the day when every patient can possibly get a physician's care.

In England, Canada, Australia, and all Commonwealth countries, since 1846, when anesthesia went around the world, only physicians have administered anesthesia, by demand of the surgeons.

I think this fact is evidence of pure medical thinking on the part of the doctors in those countries, and we're just maturing to the concept in the United States.

Q. Dr. Collins, should a nurse other than a nurse anesthetist be assigned to watch a patient under spinal anesthesia?

DR. COLLINS: My feeling is that the non-trained anesthetist or a person not cognizant of anesthesia problems should *not* take care of a patient under spinal block or local. There are very often practical solutions to problems that must be carried out on the spot. There may be a dearth of personnel; there may be an emergency in another room. I must admit that I am guilty of leaving a patient under a spinal in order to help one of the residents resuscitate a patient. I feel that if a patient's life is in danger, my services there are much more important than with a patient who I know is going to survive the ordeal of spinal anesthesia. Those are extenuating circumstances, and I think we have to accept them.

Q. Dr. Collins, when there are three anesthetists in the room and only one circulating nurse, who is supposed to turn on the suction?

DR. COLLINS: I can't understand how you can have three anesthetists in one room. Most of the time, except, for example, when we're training an individual, I expect the residents to be confined in their thoughts

and observations to what the senior man is doing, and I don't think that the problem of turning on the suction should take their time away from learning.

MISS HALL: Dr. Hurwitt, will you make a few closing remarks?

DR. HURWITT: This has been a happy meeting, and a most stimulating experience for all of us on the panel. We all profited in no small measure; we have highlighted some of the things in our own institutions that we were taking for granted, and we have brought out problems that we weren't aware of, problems that could stand real improvement.

I always get a tremendous thrill out of talking before a group of nurses. This is by far the largest group of nurses that I've ever been confronted with.

I think it's a privilege to work in an operating room. This is without any sentimentality or anything else. The operating room is the most exciting, the most dynamic, the most imperative area in the hospital. I think perhaps at times we lose sight of the fact that under most circumstances the problems of the operating room are not so stupendous that one has to have a lawyer, a hospital administrator, and an entire formal organization to work them out. For the most part they can be worked out by a compatible operating room supervisor and the person designated by the hospital administration to represent the professional services of the hospital.

I *do* believe that there are situations in which the operating room committee is very important, but I think these situations are in the minority. In a hospital that is moving along smoothly, where you have this kind of compatibility between the administrative head of the nursing services in the operating room, and the administrative head of the professional services, I think that almost all our problems can be worked out on this level.

Some remarks have been made about supercilious surgeons, or surgeons who have very pompous, didactic attitudes. I'd like to go back for a second to my not too remote past, when I put on my first uniform at the Massachusetts General Hospital and was quite overwhelmed by operating room nurses who thought, "Aha, another new doctor. Pretty green. Doesn't know very much." You girls also have to give a little bit as well as expecting the doctors to give a little bit, when you're in an institution in which the interns are on a rotating basis, coming through the operating room in new batches every six weeks or every two months.

Some of these boys are interested in psychiatry or dermatology, or other areas. They're not going to know a great deal about surgery. They're not going to be antagonistic until they're antagonized by a group of super-O.R. people who know a great deal more than these boys would or should. But if you'll be big sisters to them and just show them instead of barking at them, I think you'll get along better with the doctors, and the doctors will get along better with you.

I was very grateful for Mother Alice's compassion for us nervous surgeons. It's a great help to have a mature, motherly influence in the operating room. There are times when we do get a little bit upset, sometimes when the blood starts to spurt a little bit more freely than we would like. A calm, assured operating room nurse, again one whose face, not back, is toward you,

is a tremendous source of comfort to the surgeon, and often may help save the patient's life.

I've been very much impressed by the practical nature of the questions to the panel. You're very much interested in the immediate technological aspect of your work. What impressed me even more was the sociologic aspect of operating room nursing, which frankly had never occurred to me before. I'm delighted that you are more concerned with what's happening to the patient than with who's going to relieve you at 4 o'clock so you can get unscrubbed and get to do what you had scheduled for 4:30.

Almost every question raised, stirred a controversy here on the panel—which shows that nothing is all white or all black. The fact that those of us selected to discuss some of these problems are not unanimous in our appraisal of them should not be disturbing to you, but should really re-emphasize the short distance that we've gone. There is a great amount of distance that has to be covered before we can really be complacent, and I doubt if we ever will be complacent about the operating room.

I never dreamed that your first national organizational meeting would have such a tremendous registration; would have such sincere interest. It's awfully gratifying to those of us who are doing the operating room work to know that our counterparts are so deeply interested.

Right: Listening intently to lively question-and-answer session following problem clinic were (l. to r.): Sister Turcotte, Sister Ratte, and Sister Landry, all from St. Peter's Hospital, New Brunswick, N. J.

New Developments in Anesthesia

● *Abuse of parenteral fluids, cardiac arrest, anesthesia for children, and special anesthesia technics were among subjects discussed at the Conference of Anesthetists during the Tri-State Hospital Assembly held in Chicago.*

Abuse of Parenteral Fluids

Robert E. L. Berry, M.D., Associate Professor of Surgery, University of Michigan Hospital, Ann Arbor, Mich.—Glucose and water solutions should be used, rather than sodium chloride solutions, to initiate intravenous fluids at the beginning of the operation, as this will prevent unnecessary sodium salt loading.

There is no substitute for whole blood during operation, particularly if the operation is of considerable duration and magnitude and the blood loss is greater than 500 cc.

Postoperatively it would be ideal to provide exactly what is needed. Practically, this is impossible because of the numerous variables in post-operative care, the individual handling of supportive fluids, and defects in our knowledge.

Careful correlation of postoperative physical findings and laboratory examinations is necessary if maximum safety of parenteral fluid administration is to be obtained.

Administration of sodium salt solutions as a source of water should be avoided. Volume for volume replacement of extrarenal losses of fluid with sodium salt solutions of approximate constitutents must be done if electrolyte depletion is to be avoided.

Amino acid solutions are of little benefit in the days immediately following operation in well nourished patients. They may be of considerable help in long-term fluid therapy. In the presence of hepatic damage, caution should be exercised during their administration.

Anesthesia for Children

G. C. Kreuter, M.D., Attending Anesthesiologist, Milwaukee (Wis.) Children's Hospital—The ideal preoperative state is that of the drug-induced hypnosis in which the child is very drowsy but still cooperative. In addition, a state of amnesia may be added so that the child has no recollection whatsoever of his experience.

The amount of the drugs used for premedication is usually determined by body weight. Children under twenty pounds get no premedication. The dosage range starts with the twenty pound child who receives pentobarbital ½ grain and scopolamine 1/350 grain. The dosages are gradually increased to a point where the large child, weighing over one hundred pounds, will receive pentobarbital 1½ grains and scopolamine 1/150 grains. In place of the above schedule of premedication, it is sometimes advantageous to use a rectal barbituate such as thiopental.

Premedication may be markedly reduced, or omitted entirely, in children of poor general physical state, or in children who have illnesses that may increase the hazards of the anesthetic.

The use of the open mask technic for the administration of ether provides a relatively safe, effective means for anesthetizing young children. For the individual who works with children only occasionally, it is an ideal method.

However, even with a technic as simple as this, there are dangers which are many times overlooked. It has been shown that the oxygen content under the mask falls to alarmingly low levels during the ordinary course of anesthesia. If supplementary oxygen is not administered, there is danger of hypoxia developing in the child. The addition of 500 cc. or 1 liter flow of oxygen per minute under an open ether mask throughout the conduct of the anesthetic, will remove this hazard.

In using the ether blower for the oral or pharyngeal insufflation of air-ether mixtures, as is commonly employed for tonsillectomies or similar operations, caution must be exercised if oxygen is to be added to the anesthetic mixture.

Many times when the insufflation technic is used, respiratory obstruction is present. It may be due to a tongue retractor or to some other instrument, or it may be due to blood or secretions in the airway. The obstructed airway will usually manifest itself by such changes as cyanosis, labored respiration, or increased pulse rate. However, if oxygen is added to the anesthetic mixture, many of these warning signs will be masked. The obstructed airway remains but the gaseous exchange on respiration is still inadequate and carbon dioxide excess develops in the child.

When using an anesthetic machine with a closed or semi-closed technic, we must keep in mind that children are not merely small adults. Hazards such as excessive dead space, valvular resistance and ineffective absorption of carbon dioxide are of even more importance in anesthetic management in children than they are in that of adults.

Hypoxia is by far the most dangerous of the complications of anesthesia. Many times it goes unrecognized and the consequences are terrible.

We must remember that any noisy breathing is obstructed breathing. It is our duty to prevent it.

Shock occurring during a surgical procedure is not unusual. In most instances, this condition is easily corrected by transfusing the patient with whole blood.

In recent years it has been shown that deep anesthesia interferes with the body's mechanisms of defense against shock. The combination of surgical trauma and deep anesthesia may place the child in a precarious state of circulatory depression.

Bearing this in mind, we should strive for only that level of anesthesia that allows the surgeon to perform his work in a satisfactory manner.

We should attempt to suit the anesthetic level to the depth needed at any particular time, allowing the level to come up during those times that deep anesthesia is not necessary.

Special Technics of Anesthesia

Sister Mary Odila, R.N., S.D.S., St. Joseph's Hospital, West Bend, Wis.—Respiration is, and has always been, recognized as one of the most dependable criteria of the anesthetic level. Therefore, if we are to depend upon this basic sign as our best guide, we must familiarize ourselves with all of the modifying factors which may come into play.

Usually the easiest anesthetic situation is that in which the patient is supine and level, with the operating procedure being confined to superficial work not requiring profound relaxation.

Ideally, the depth of the Trendelenberg position should not exceed 15 degrees. Certainly, some flexibility should be exercised in this respect. On the other hand there are those patients who have difficulty tolerating even 15 degrees. Striking examples are the obese and the cardiocirculatory diseased. The reverse Trendelenberg or Fowler position, when in excess, presents certain problems. There is the tendency to pooling of blood in the lower extremities, in proportion to the depth of anesthesia, and the consequent degree of relaxation.

The prone position is poorly tolerated. This is especially true in the adult. To use the prone position without deleterious effects, the following aids may be used: A small firm pillow placed under the shoulder girdle anteriorly places the weight of the chest on the upper less mobile portion, leaving the lower ribs free to move with respiration. To facilitate respiratory movement of the chest further, a pillow may be placed under the body to support the pelvis at the iliac crests.

The lateral or kidney position is a very difficult position all ways. It is hard to establish, to maintain, and to have satisfactory respiratory movements of the chest. The position commonly used which interferes with respirations to the greatest degree is the lithotomy position.

To the anesthetist the maintenance of a patent airway is of prime importance. It is important that this free airway be maintained post-operatively, as well as during the conduct of anesthesia.

Obstruction of the airway calls for an increased demand on the muscles of respiration. This increased effort on the part of the patient is needed to move the mass of air past the obstruction. The additional effort required to move air past the block will eventually tire the patient and bring on a state of shock. Pulmonary edema also may develop when the negative pressure within the thorax is increased in an attempt to move air past an obstruction. This increased negative pressure predisposes to transudation of fluid into the alveoli.

Hypoxemia (decreased blood oxygen content) and hypoxia (decreased tissue oxygen content) are closely related and occur in sequence, hypoxia being a result of hypoxemia. Hypoxia may result from:

1. A decreased oxygen intake.
2. An abnormal slowing of the circulation.
3. Reduction of the oxygen carrying constituents of the blood.
4. Inability of the tissues to use the available oxygen.

The initial response to mild hypoxia is an increase in minute volume of respiration with little or no change in blood pressure. With increasing severity of oxygen lack,

the symptoms become more pronounced and represent an attempt on the part of the body to maintain adequate oxygenation of the tissues especially to the heart and brain, by facilitating the transport of oxygen by the blood.

Adequate oxygenation is most important for the maintenance of the blood pressure; thus a failing respiration constitutes a distinct danger signal. When oxygen want is acute, respirations respond with an increase in rate and depth. The action of this oxygen want is to paralyze the respiratory center and this quickly leads to respiratory failure. Hypoxia, however, increases the sensitivity of the carotid body.

Anesthesia with volatile or gaseous agents can be assured only when the agent can reach the blood stream in sufficient quantity and concentration to effect the desired depression. The anesthetic state cannot be maintained if it is impossible to preserve the blood level of the agent, and excessive blood concentrations cannot be avoided if the patient is unable to eliminate the agent because of obstruction to the airway. Patients have died because obstruction of the airway did not permit adequate elimination of high concentrations of anesthetic agents in the blood stream. Therefore, I would like to make the following simple, but pertinent, suggestions:

1. Choose the agent with which you are most familiar, unless there is some definite contraindication to its use. Remember the agent is only as safe as the individual using it.

2. Take care of ordering the pre-medication personally, unless the surgeon prefers writing his own orders. Then take into consideration the action of the drugs he has ordered in planning your approach to, as well as the conduct of, the anesthesia. A little forethought may save you a great deal of second guessing.

3. There are some logical explanations for all of the unusual phenomena occurring during anesthesia. Search for the cause and make adjustments without delay. Procrastination has no place in the anesthetist's armamentarium.

4. Remember that the major responsibility for the life of the patient during the surgical procedure is delegated to the anesthetist. May we always be sure that we are worthy of that all important responsibility.

Cardiac Emergencies

Jack L. Eisaman, M.D., Department of Internal Medicine, Caylor-Nickel Clinic and Clinic Hospital, Bluffton, Ind.—Every major surgical case over 30 years of age, or cases with a cardiac abnormality, should have an electrocardiogram. Anesthetic difficulties frequently occur when these studies are omitted.

A careful history is most important. This includes possible experience with rheumatic fever, streptococcal infections, and diphtheria. Every case for surgery should be studied carefully, analyzing the cardio-respiratory system accurately.

Any anesthetic agent is unsafe if improperly administered. All are myocardial depressants and trouble has occurred with all types. Direct stimulation of the vagus nerve in the dog will not produce cardiac arrest in the absence of hypoxia. In humans, the passage of an intratracheal tube does not cause arrhythmias unless the pa-

tient is hypoxic. This suggests that hypoxia is the factor in humans when the so called vago-vagal field reflexes are mediated.

The depressant action of intravenous procaine has been found beneficial in ventricular arrhythmias. Hearts suffering from inflammatory or degenerative lesions may tolerate only a fraction of usual dosages; therefore, control electrocardiograms should always be made. The speed of injection of intravenous procaine may influence its toxic effect upon the heart. For this reason, we feel that, rather than direct intravenous injection of 100 mg. of procaine, it is better to use a continuous drip.

In most cases of major surgery, fluid is being injected intravenously for multiple purposes. In this glucose or saline solution, 5 cc. of 20 per cent procaine are instilled when indicated, making a 0.1 or 0.2 per cent solution of procaine depending upon whether it is 1,000 or 500 cc. initial volume. The rate of drip can be adjusted as to the need.

We believe that the electrocardiograph and oscilloscope used in surgery are important not only in demonstrating arrhythmias which untreated might result in cardiac arrest, but also in detecting cardiac arrest so that massage can be initiated early.

It is the anesthetist's responsibility to let the surgeon know the exact moment trouble is at hand. If the surgeon is not in the chest or close to a great vessel, he cannot see or detect cardiac arrest.

The surgeon must reestablish circulation by massage within four minutes from the time of arrest or the brain will have irreparable damage. The anesthetist must insure adequate oxygenation and make certain the airway is open. Intratracheal intubation assists in maintaining this.

When the use of curare is adverse for the patient's breathing, aid him by bag breathing and do not hesitate to counteract it with Prostigmin®, Tensilon® and Coramine® when indicated. The role of atropine is becoming more debatable.

Irritability of the myocardium may result in the use of myocardial depressants such as procaine and quinidine. As a result, the blood pressure might fall and Wyamine® and nor-epinephrine Levophed may be given.

Intravenous fluids, plasma or blood, good functioning or well treated myocardium, all with nor-epinephrine will usually overcome hypotension or shock. When the heart rate becomes alarming, it can usually be slowed by 0.15 cc. of a 1:2000 solution of Prostigmin®, intravenously.

At times the blood pressure will fall for no apparent reason, with no significant change in pulse rate and no particular change in the electrocardiogram. Nor-epinephrine Levophed is indicated. Four cc. of 1:1000 solution is added to 1000 cc. of isotonic saline, 5 per cent glucose, plasma or whole blood. The average rate of flow is 0.5 to 1 cc. per minute but must be adjusted to the patient's blood pressure response. Ordinarily, it should not be used during cyclopropane anesthesia or with severe myocardial ischemia because of the danger of ventricular fibrillation. A bradycardia that does not respond to atropine is usually an ominous sign.

Question Box

Each month questions pertaining to O. R. problems and technics will be answered by Dr. Carl W. Walter, nationally known for his operating room technic courses and as the author of "Aseptic Treatment of Wounds" (MacMillan). Questions should be addressed care of the O. R. Editor, Hospital Topics.

Q. During the last two years at this hospital, scissors have been sterilized by autoclaving. This, of course, facilitates the sterilization of these instruments and, so far as I have been able to detect, there has been no significant deterioration in the instruments. However, the scissors available for routine use are generally in rather poor condition.

I have always felt that this is probably due chiefly to improper use of the instruments rather than to the method of sterilization. This has been your own feeling, I believe, as expressed in your book.

Recently, a new operating room superintendent has reintroduced cold solution sterilization for scissors, using a three hour period in Bard-Parker solution. This has caused me concern, chiefly because it seems to me unnecessary; and also because we have a constant turnover in personnel, and the difficulty in controlling the human element seems insurmountable.

Furthermore, I am apprehensive about the contamination of the instruments with formaldehyde. Is the evidence that autoclaving does not damage scissors sufficiently conclusive that I can take a positive stand on this?

A. Steam sterilization does not affect properly made stainless steel scissors and is the only reliable way of controlling the transmission of the virus of homologous serum jaundice, other than prolonged dry heat sterilization. I have been increasingly uncomfortable concerning the use of cold sterilization of any kind.

I would recommend that you use dry heat sterilization as the safest, most innocuous method and one suit-

able for all types of cutting edge instruments. A sterilizer such as illustrated in Figures 112 and 94-4 of *Aseptic Treatment of Wounds* is satisfactory.

Failing this, instruments can be sterilized by dry heat simply by loading them into the steam sterilizer, turning the steam into the jacket but not the chamber, and leaving them there all night. In this way, they are exposed for at least four hours to a temperature of 121° C.

Q. I use a small autoclave for all autoclaving in the doctor's office in which I work and I find I have one troublesome problem.

We use B.D. constrictor tubes for needle containers. I find that I cannot eliminate moisture from these tubes after sterilization has been completed, and I do not feel safe in storing these needles. I process the needles, and all other materials, in accordance with the directions given in the manufacturer's instruction book. I have tried variations of these methods, but without consistent success. Can you offer any suggestions?

A. Constrictor tubes such as you mention are difficult to process so that they can be removed from the steam sterilizer absolutely dry. The moisture in the tube indicates that they have been sterilized properly but the steam does not escape at the end of the sterilizing process, and condensation occurs.

I suggest that they be dried by exposure to dry heat to drive off the moisture. Placing them on top of the sterilizer while the next load is being processed should do the trick. Also, preheating the glass tubes to avoid excess condensation during sterilization is effective.

Q. All literature published regarding the sterilizing of oil and Vaseline states that this procedure should be carried out in the hot air sterilizer or by oven heat.

Would you give us your opinion on the validity of the material published?

A. Sterilization of anhydrous substances, such as petroleum jelly, requires special consideration because bacteria contaminating them are also dry. In the absence of moisture, more prolonged exposure and increased temperature are required for microbicidal action. The thermal death time of dry heat-resistant bacterial spores is 160 minutes at 320° F. (160° C.). The presence of but 0.5 percent moisture decreases this to 160 minutes at 257° F. (125° C.) or 240 minutes at 250° F. (121° C.).

Another problem in the sterilization of anhydrous materials is heating the material. Energy is transferred in the dry heat process by convection, radiation and conduction. The role each mode plays depends upon the type of sterilizer used. Hot air ovens utilize convection, often forced. Dry heat sterilizers have electrically heated shelves where conduction and radiation are the important factors. Steam sterilizers, with 250° F. in the jacket, heat by radiation and convection.

The material itself must be heated throughout. This occurs by conduction and is a relatively slow process because the quantity of energy available is low. It takes 60 minutes for 30 cc. of petrolatum in an ointment jar to reach 160° C. when in contact with an aluminum plate heated to 160° C. In hot air this same jar requires 110 minutes exposure. Sterilization by

dry heat is therefore time-consuming.

Fires occur when the materials are heated above their flash or ignition points. This happens because the temperature control of hot air ovens is faulty and overheating occurs.

Petroleum jelly is logically sterilized in a dressing sterilizer. Thirty minutes exposure to saturated steam at 121° C. serves to heat and hydrate even large masses. The steam is then vented from the chamber and the radiant energy from the jacket sterilizes the jelly by dry heat at 121° C. during a four hour exposure.

Bacteriology in this field is difficult to interpret because thoroughly dry spores are not used. Slight traces of moisture suffice to lower the thermal death time.

Q. What is the recommended method of sterilizing T-tubes in the operating room? What is the best method for storing them after sterilization?

A. Rubber T-tubes can be wrapped in muslin wrappers, sterilized in saturated steam at 250° F. for 30 minutes and stored along with other sterile supplies. Care must be taken to flush the lumen of the tube with water before it is placed in the sterilizer.

Tygon tubing is not safe for use on anesthesia equipment and is not conductive. Conductive rubber alone should be used for this purpose.

Q. What do you think of the practice of open windows during surgery? We do not allow this, but some surgeons request it.

A. Windows should not be opened during surgery. The problem of airborne contamination of the operative wound is complicated enough without introducing the hazard of street dust and dirt being blown in to contaminate instruments and wound.

Neither should electric fans be allowed in an operating room. They stir up dust and dirt and settle all manner of detritus in the patient's wound. A room size air conditioning unit is not prohibitively expensive, and, when mounted five feet above the floor, provides safety for the patient as well as comfort for the staff.

Q. In the surgery where I am supervisor we do chest surgery, thoracoplasty, pneumonectomy, etc. My knowledge in tuberculosis is limited and I need your help. I find that they have been soaking the anesthesia machine tubing and face mask in Zephiran 1:1000 for an hour, then using it on the next patient. I feel we should use a second set or soak it longer. Our anesthesiologist feels as I do, but we would like your opinion.

A. It has recently been shown that the quaternary ammonium compounds do not destroy tubercle bacilli. There are few germicides which destroy these bacteria. Those available are

ethyl alcohol 70 percent
isopropyl alcohol 70 percent
cresol solution saponated USP XIII
orthophenyl phenol
P. Tert. Amylphenol 2 percent.

Following surgery, the anesthesia equipment used in the case should be immersed in an appropriate solution for 15 minutes. It is then scrubbed to remove all mucus. When the equipment is clean, it is rinsed in tap water,

dried, and returned to storage.

Q. There have been questions arising in our operating room regarding care of articles following septic cases. We would certainly appreciate your help in answering the following question:

Is it necessary to wash all furniture in the room with antiseptic solution following a "dirty" case?

A. All potentially contaminated areas of furniture used in a room in which a septic case is done should be disinfected with a solution of sodium hypochlorite or an aqueous solution of a quaternary ammonium compound. Spots of blood and pus on the floor should be immediately covered with lime paste, which is subsequently mopped up in the routine disinfection of the floor. This is described in detail in my monograph, *Aseptic Treatment of Wounds.*

Q. We have been using Zephiran Chloride 1:1000 solution for sterilization of eye instruments. At a recent meeting our eye surgeon was told of various cases in which the patient lost the eye due to infection. The instruments had been sterilized in Zephiran Chloride 1:1000 and our surgeon was given the impression that Zephiran Chloride was not an adequate sterilizing agent. What method can be used for sterilizing the delicate eye instruments, especially the kerotomes and needle knives?

You recommend the use of plastic tips on syringes when sterilizing by dry heat. Where may they be obtained?

Is tygon plastic tubing safe to use on the ether insufflator? Is it conductive?

A. Delicate instruments which are destroyed by heat can be adequately disinfected in a 1:1000 solution of aqueous Zephiran. They should be clean, dry, and free of oil and grease when put to soak for 18 hours.

Instruments which will withstand a temperature of 250° F. but are destroyed by moist heat can be safely sterilized by exposure to dry heat at 250° F. for four hours. This is accomplished by a technic similar to that used for dry heat sterilization of assembled syringes. The instruments are placed in the chamber of an ordinary dressing sterilizer. The door is locked and steam is turned into the jacket only. The instruments are left at 250° F. for four hours.

The plastic tips for syringes are available from Fenwal Laboratories Inc., 47 Mellon, Framingham, Mass.

Tygon tubing is not safe for use on anesthesia equipment and is not conductive. Conductive rubber alone should be used for this purpose.

Q. One of the surgeons has remarked that detergents used in the cleansing of glassware, particularly in the case of syringes, have been considered likely agents in the cause of severe reactions to spinal injections. Can you furnish us with any information concerning the following:

1. Have you had any similar complaints from other doctors or hospitals?

2. Is it possible to obtain the names of the residual chemicals?

3. Has any research been made with animals to discover the effects of the residual chemicals on organisms?

A. Residual germicides and detergents in syringes and needles have been demonstrated to be the cause of severe reactions and, indeed, paraplegia when intrathecal medications are administered in carelessly cleaned equipment. Several articles have appeared in medical literature describing such accidents.

It is incumbent upon the hospital to wash syringes and needles with a non-ionizing detergent and to rinse these parts copiously with distilled water. A mechanical washer should be used because it can be relied upon to rinse adequately. The syringe parts should be dried thoroughly prior to sterilization and should be sterilized by dry heat to avoid the leaching effect of steam on the ground glass surfaces. This effect in itself liberates enough alkali to cause a deterioration of sensitive drugs such as procaine.

Q. One great problem we have is sterilization of lumbar puncture needles with stylette removed—it seems that a great many of our nurses are familiar with the technic of sterilizing them assembled. Is this technic advisable? Another question is the use of syringe and needle cans, the proper position of cans when placed in autoclave for sterilization. Should the cans be upright or on their side?

A. Needles and stylettes of dissimilar metals should not be sterilized together because an electrolytic action is set up between the stylette and needle which causes early corrosion and weakening. In the case of spinal needles, these may be sterilized together because the metals used are of the same kind.

The use of a container for sterilization of multiple syringes and needles emphasizes the hazard of contamination by improper use or carelessness. In an environment such as the operating room where the personnel are of high calibre, I feel a multiple syringe container for one-day supply can be used safely. I do not advocate its use on the ward or in places where untrained individuals have access to its supply. Every patient should have individually packaged and sterilized supplies. These containers and any covered container should be sterilized on their sides to allow for the escape of air and exposure to saturated steam. This technic is described and illustrated on pages 70, 71 and 72 of my monograph, *Aseptic Treatment of Wounds.*

Q. I have had the pleasure of attending your classes on operating room technic and management, and have attempted to carry forth your teachings. The problem of sterilizing metal with cloth has arisen. We have been inserting our cysto pans within our cysto packs, and apparently there is some question as to their sterility. They have been run the required time at the required temperature. Is there a ruling against combining the metal with cloth?

A. I know of no contraindication to sterilizing basins and textiles together provided all the precautions for assuring sterility are observed. The pack must not be so dense as to impede penetration by steam. The basins must not be nested, and in the sterilizer the whole must be positioned to provide for a horizontal path for escape of air. The exposure time is 30 minutes at 121°C. (250°F.).

Q. At the present we are busy with plans for a new surgical suite which will serve a 100-bed hospital. I have suggested we not purchase water sterilizers but have a still and use flasks as we have been taught in your institute which I attended in Indianapolis.

Will you tell me what method is used to heat the water in the flasks for the use in hot packs, etc.? I want to have good answers to the questions the surgeons will, I am sure, bring up in regard to this method of having hot water.

A. The flasks are usually heated in a blanket warmer maintained at 140° F. The blanket warmer serves to dehydrate blankets and hospital "johnnies" so that they absorb more perspiration from the patient's skin and are thus more useful than one which has been kept at room temperature and is saturated with moisture.

The flasks of water at 140° F. are mixed with water in flasks kept at room temperature at the operating table to yield a solution at about 112° F. which is the best hemostatic temperature available.

Q. In the February issue of HOSPITAL TOPICS it is noted on page 71 that the following question was asked: "Should any nylon garments be permitted in the operating room?" Within the answer given it states, "For this reason nylon stockings may be worn."

In the 1950 issue of the pamphlet, Recommended Safe Practice for Hospital Operating Rooms, adopted by National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass., a statement was made on page 25, noting "Fabrics of silk or synthetic textile materials such as rayon or nylon, including 'sharkskin,' should never be permitted in anesthetizing locations as outer garments, hosiery, or for non-apparel purposes."

Has the National Fire Protection Association edited a later edition authorizing the use of nylon hosiery?

A. The most recent issue of Bulletin 56 removed the restrictions on wearing synthetic textiles next to the skin. Hence, any garment which is worn so that its entire surface is contacted by the skin is considered safe. In this way hosiery is permitted in the operating room.

Outer garments, however, where a large portion of the textile does not contact the skin, must be of cotton. The reason for this change is simply that the moist skin serves to equalize charges on nylon and prevents the build-up of dangerous potential.

A garment such as a slip, however, where only a small portion of the bodice may be in contact with the skin, is dangerous in that the long, free-hanging skirt is rubbed and builds up dangerous potentials which cannot discharge except by sparking to areas of lower potential.

Q. Several times questions have arisen among our surgeons and nurses concerning the use of wet drapes, and whether or not they are surgically safe. I would appreciate your opinion regarding the following situations:

1. When sterile towels, wet with water, are draped about a wound, is the prepared skin area beneath considered contaminated if penetration to it is complete?

2. If sterile water or normal saline has dripped onto the Mayo stand or the nurse's back table during the

course of an operation, penetrating the four layers of drapes, is the material contaminated?

3. If, during a Caesarean section, amniotic fluid penetrates beyond the surgically prepared area, is this considered contaminated?

4. If the surgeon's gown (two thicknesses) should become wet with sterile water or the patient's blood, should he be expected to change if it involves his forearm, elbow or the bodice portion of the gown?

A. Dry towels do not present a mechanical barrier to fluids carrying bacteria in the sense that a sheet of cellophane would prevent such liquid from penetrating the barrier. Thus, if a towel is placed in a pool of contaminated liquid on a Mayo stand, the liquid would carry the bacteria upwards into the towel. Similarly, if a sterile towel were applied to a sterile Mayo stand and contaminated fluid were dropped onto the towel, it would penetrate it and contaminate the Mayo stand.

Several layers of textile on a Mayo stand serve as a sterile field for appreciable periods when sterile solutions are dropped on the towels and gradually soak through. Bacteria on the Mayo stand may become moistened and begin to multiply, but it takes several hours for them to grow up through the tract of the moisture to contaminate the presenting surface.

Perspiration soaking through the surgeon's gowns certainly contaminates the presenting surface of the gown. On the other hand, the patient's blood or saline solution moistening the skin of the wrist above the cuff of the glove is not a severe hazard because the skin has previously been disinfected.

Q. A question has recently come up in our anesthesia department concerning the danger of ether anesthesia in the presence of cautery. May I have your advice on the following questions?

Is it considered a safe and an accepted practice to use open drop ether or insufflation anesthesia while using a cautery on the head for neurosurgery if wet towels are used for draping?

Is it safe to use ether-oxygen under the same circumstances?

Is it safe to use nitrous-oxide-ether-oxygen with the above conditions?

Is it safe to use any of the above anesthetics if a closed system with endotracheal technic is used?

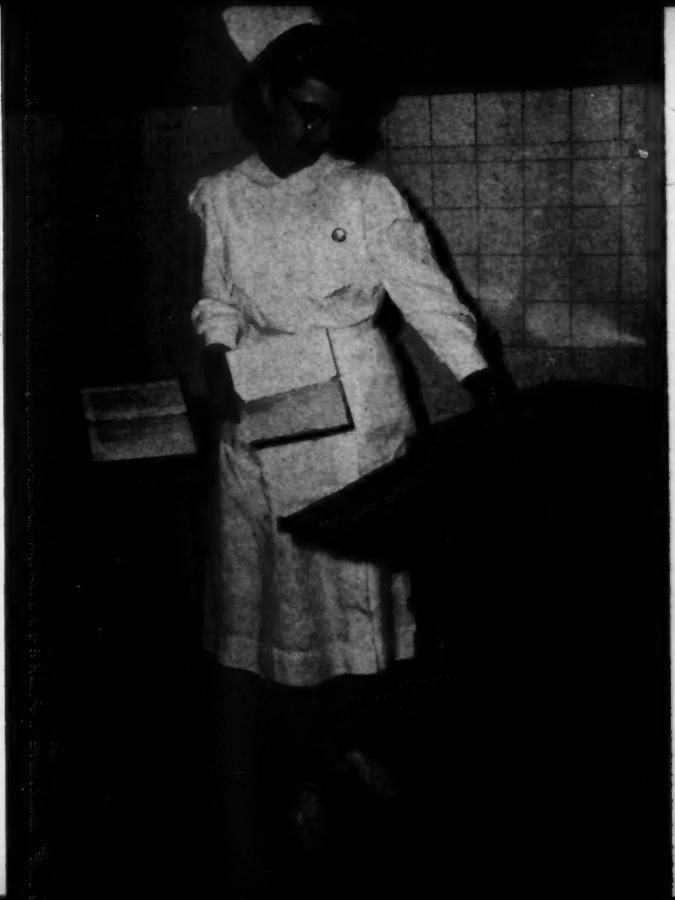
What anesthetic and technic are safe and approved for babies or small children for neurosurgery on the head when cautery is necessary for the surgeon?

A. The use of either an open cautery or an endothermy type of cautery in the presence of a flammable anesthetic is hazardous for the patient. Open drop ether, ether-oxygen is explosive when mixed with the proper amounts of air or oxygen. These concentrations are often encountered during routine anesthesia. Explosive deaths have been described due to the use of the endothermy by pre-eminent neurosurgeons operating upon the brain while a flammable anesthesia mixture was being administered.

There are many intravenous and rectal anesthetics which can be administered safely by a competent anesthesiologist, so that the surgeon can accomplish his work without trespassing in a hazardous area.

Special Rack Allows Ready Reference in Surgery

● When surgery is performed at Bishop Clarkson Hospital, Omaha, Neb., a card showing the surgeon's requirements for the particular operation is right at hand in the operating room for quick reference. Card is put on rack shown at left in picture. Rack is placed near the scrub nurse, so that she may have access to it at any time. A card is kept for each surgeon for each procedure. Here Dorothy Patach, O.R.S., pulls a card from permanent card file. On each card is listed what the surgeon requires in instruments, needles, sutures, position of patient, skin preparation, drape, special items (such as catheters, drains, packs and solutions), and general information (such as tables to work from, sponge counts, special lights, postoperative dressing, and glove size). Clarkson personnel call the special stand (built in the hospital workshop) "our music rack." It is covered with glass to protect cards from being splashed by solutions.



Preparation of Tracheotomy Trays

● High on the list of emergency trays in a hospital is the tracheotomy tray. In fact, if such equipment were to be classified as life-saving this tray would be placed as one of the first in importance. For this reason, in operating rooms and ear, nose, and throat departments tracheotomy trays should be complete, sterile, and available at all times. The rest of the hospital may depend upon Central Supply for such equipment, but, whatever the system, all responsible personnel should be instructed as to where the tray may be obtained in an emergency.

CHECK TRAYS

Tracheotomy trays should be checked thoroughly and often by a responsible person to see that all tracheotomy tubes are complete with inner tubes, obturators and tape in place. Several complete tracheotomy tubes and a life-saving tube should be on each tray. The instruments for the emergency tray are fairly simple, consisting of:

- 2 Knife handles #3 with #10 & 11 blades.
- 1 Small Mayo scissors.
- 1 Thumb forceps.
- 1 Tissue forceps.
- 1 Bayonet forceps.
- 2 Allis forceps.
- 2 Large hemostats.
- 12 Small hemostats, curved.
- 1 Rake retractor.
- 1 Small right angle retractor.
- 1 Skin hook.
- 1 Trachea dilator.
- 1 Needle holder.
- 1 Life-saving tube.
- Tracheotomy tubes, assorted sizes.
- Small curved cutting, and non-cutting needles.
- Silk for sutures.
- Suction tips.
- Catheters #12, 14, and 16.

In the operating room, when the case is not an emergency and a tracheotomy is anticipated, nurses should have no difficulty in the preparation of a surgical set-up. A more complete list of instruments may be expected, and a tongue depressor, mouth gag, syringes and needles, and containers for solutions may be added. Vaseline, iodoform strips, sterile dressings, and bandage should be available.

An extra tracheotomy tube should always be sent back with the patient until a check is made to see that a sterile tracheotomy tray is at the patient's bedside. If the patient is unconscious, he should be watched constantly. After consciousness is regained a buzzer should be placed within easy reach unless there is someone to give special attendance. Nurses should care for the inner tube, keeping it clean and free from obstruction. If the outer tube is to be changed it should be done by the surgeon. The nurse must also keep the

trachea and bronchi free of obstruction, which requires a great deal more skill and attention.

Such emergencies as a short tube being caught in one of the trachea rings, or a tube being out of position or obstructed by secretions, may arise. By having proper equipment on the sterile tray, an efficient suction at hand, and a nurse skilled in the handling of these cases, a patient may be spared fatal asphyxia. In an operating room where general surgery is done, it is seldom necessary to do an emergency tracheotomy, but the fact should be stressed that it may be a life-saving procedure and no operating room is complete without a sterile tracheotomy tray.

For the treatment of surgical shock, drug reaction, and other such emergencies, the present trend is to have the anesthesiologist directly responsible for stimulants, resuscitation apparatus, etc. He also orders and keeps such supplies available. Nevertheless, it is well to stock each operating room with a small routine supply to be used when no anesthesiologist is present or until he arrives. Very often during these emergencies it is necessary to repeat drugs, using extra needles, syringes, ampules, etc., until the supply is depleted and it is necessary to take articles from other rooms. To prevent this and to meet any other unusual need, it is very worthwhile to have an extra supply assembled in an emergency stimulant box which is kept in a centrally located space. The anesthesiologist should be consulted as to the contents of this box so that he may make suggestions and add to the following routine supplies:

ROUTINE SUPPLIES

Sterile 2 cc syringes.
Sterile 5 cc syringes.
Sterile needles (ample supply of assorted sizes).
Tourniquet.
Sponges.
Alcohol.
Caffeine Sod. Benzoate.
Coramine.
Adrenalin (ampules).
Ephedrine Sulphate.
Neo-synephrine.
Epinephrine.
Picrotoxin.

The box should be checked and restocked after each use.

PROBLEM CORNER

Q. Can you tell me where I might write to secure films to use as teaching aids? I thought we might find them adaptable to our in-service program.

A. *For information on film distributors write to:*

Educational Film Library Association
1600 Broadway
New York 19, N. Y.

Film Council of America
600 Davis St.
Evanston, Ill.

For film information write to:

American Medical Association
535 N. Dearborn St.
Chicago, Ill.

American Hospital Association
18 E. Division St.
Chicago, Ill.

Selected Films for Nursing Education
Audio-Visual Center
Indiana University
Bloomington, Ind.

O.R. Supervisors Meet with Surgeons

For the third consecutive year, the International College of Surgeons held sessions for surgical nurses at its annual congress, which met in Chicago, September 6-10, 1954.

Featured on this year's program were two joint sessions of nurses and surgeons. In picture at right, E. Trier Morch, M.D., director, division of anesthesia, University of Chicago School of Medicine, addresses joint session on operating room emergencies.

At left: Speaking at sterilization panel were John H. Bailey, Ph.D., Sterling Winthrop Research Institute, Rensselaer, N. Y.; Marian L. Fox, R.N., nursing specialist, AHA; and John Perkins, director of research, American Sterilizer Co., Erie, Pa.

George J. Thomas, M.D., (second from l.), professor of anesthesiology, University of Pittsburgh School of Medicine, gave demonstration on fire and explosion hazards at session on operating room emergencies. Looking on here are fellow speakers E. Trier Morch, M.D., director, division of anesthesia, University of Chicago School of Medicine; Max Sadove, M.D., professor of anesthesiology, University of Illinois College of Medicine; Gordon Wyant, M.D., head, division of anesthesia, Stritch School of Medicine, Loyola University, Chicago; and Francis L. Lederer, M.D., Chicago, who presided.

Muscle Relaxants

by Frank Cole, M.D.

Chief, Department of Anesthesiology
Lincoln General Hospital, Lincoln, Neb.

● While the original purpose of surgical anesthesia was only the elimination of operative pain, it was soon found that motor as well as sensory anesthesia was both possible and desirable. Relaxation has become indispensable in the past quarter century. Curare was introduced into this field in 1942, enabling the anesthetist to produce relaxation easily and quickly, without resorting to deep anesthesia or to the addition of spinal block to general anesthesia. It should be remembered that all anesthetics are muscle relaxants, and that earlier substances including quinine and its derivatives, magnesium salts, and erythroidine, accomplish muscular relaxation; during recent years no less than eight different relaxants have come into widespread use.

Muscle relaxants act at the myoneural or neuromuscular junction; all displace acetylcholine from the chemoreceptors of the post-junctional membrane, but older and newer agents differ somewhat in their site of action, while mephenesin may or may not act at the myoneural junction and may not affect neuromuscular transmission in cats and dogs and accomplish its effect by decreasing reflex excitability of the spinal cord. Some relaxants prevent the acetylcholine released by the passage of an impulse along a nerve from depolarizing the post-junctional membrane. They may combine with the effector substance and raise the threshold of the effector organ. Others

cause persistent depolarization and prevent the membrane from becoming repolarized, and thereby render the unit ineffective and prevent the acetylcholine-acetylcholine esterase system from functioning.

The order of muscles paralyzed by relaxants is not necessarily the same for all agents, but for curare it is this: face, pharynx, neck, extremities, abdomen, intercostals, diaphragm.

Curare is partly destroyed by the liver, partly excreted unchanged by the kidney. Succinylcholine is hydrolyzed by both plasma cholinesterase and true acetylcholine esterase into choline and succinic acid. Mytolon is quickly excreted in the urine, which sometimes becomes pink. Flaxedil, mytolon, and syncurine are excreted largely unchanged by the kidneys.

The effect on the heart is to produce a fall in blood pressure, but only with large doses (curare). The respiratory system exhibits depression, sometimes to the point of apnea; the depression is usually peripheral, but may with large doses be central. Smooth muscle of the intestine may be relaxed; tone and peristalsis of the gastrointestinal tract are probably decreased.

The effect of large doses on the central nervous system in producing actual anesthesia is questionable. One study indicates that no loss of consciousness can be accomplished, while another article suggests that this may not be so.

Tubocurarine is a quaternary alkaloid; in general, curarizing or relaxing drugs contain several quaternary nitrogen atoms or ammonium groups placed about 14 Angstrom units apart in the molecule.

Muscle relaxants used now or recently are these:

1. Intocostrin (purified extract of curare, formerly called unauthenticated extract of curare; 20 rabbit head-drop units per cc.; contains about 60 percent d-tubocurarine and 40 percent other quaternary and tertiary curare bases).

2. d-tubocurarine, tubarine; tubadil is tubocurarine in oil.

3. Dimethyl ether of tubocurarine (dimethyl tubocurarine, metubine, mecostrin).

4. Mephenesin, an ether of glycerol (myanesin, BDH 312, also referred to as tolserol, dioloxol, myoxane, oranixon, sinan, tolulexin, relaxar, glykresin, tolcril, myodetensine, toloxyn).

5. Flaxedil (gallamine).

6. Mytolon (benzoquinonium).

7. Syncurine: C 10, decamethonium, eulissin, bistrimethylammonium decane (diiodide).

8. Succinylcholine (scoline, brevidil, diacetylcholine, anectine, sudexol, sucostrin, quelicin, suxamethonium).

9. Compound 20 (laudolissin, laudexium methylsulphate), a heterocyclic decamethylene bis quaternary ammonium compound.

Antidotes for curare have included, in history: potassium salts, physostigmine (eserine), sugar, salt, iodine, bromine, alkali (sodium bicarbonate), bile salts, guanidine, ephedrine, epinephrine, and calcium salts. Antagonists used today are probably only neostigmine (prostigmine), and edrophonium (tensilon, Ro 2-3198). These are

effective only against intocostrin, tubocurarine, dimethyl tubocurarine, and flaxedil; they will not antagonize (and may even prolong the action of) mytolon, syncurine, and succinylcholine. Newer antidotes are cholinergic substances; they are quaternary amines or ammonium salts and are able to compete with curare for the specific receptor substance and displace it from the receptor or effector cells at the neuromuscular junction. The dose of neostigmine is 0.5 mg. or more. Tensilon is supplied in a concentration of 10 mg. per cc.; the dose is 1 to 2 or 3 cc. intravenously. It acts in one minute and lasts about 10 minutes. Its low anticholinesterase activity suggests that its anticurare action is not an anticholinesterase mechanism. Side effects of neostigmine and edrophonium include bradycardia, blood pressure fall, bronchospasm, and salivation; atropine is often given to eliminate or to prevent these. Complications probably occur oftener with neostigmine, and may include an increase in intestinal motility. A compound 49-204 has recently been described as an antagonist to syncurine, but with large doses an adverse curare-like effect may occur, especially when ether or d-tubocurarine has been used. Pentamethonium iodide (bistrimethylammonium pentane diiodide) is an antidote for C10, but does not appear to be useful, having an autonomic blocking effect. Neostigmine is an antidote for laudolissin. In animals, succinylcholine itself is an antagonist for laudolissin.

USES OF RELAXANTS

These are the uses of muscle relaxants:

1. Production of relaxation of muscles.
2. Facilitation of tracheal intubation. The action here is twofold: the relaxation of the jaw muscles, enabling the anesthetist to expose the larynx, and abduction of the vocal cords, allowing him then to insert the tube into the trachea.
3. Reduction of amount of (other) anesthetic agents used, and particularly, the ability to carry the patient in a lighter level of anesthesia.
4. Prevention and treatment of laryngospasm.
5. Facilitation (in light anesthesia) of control of respiration.

Possible contraindications for the use of muscle relaxants are:

1. Inability of the anesthetist to perform artificial respiration.
2. Myasthenia gravis.
3. Theoretically: relaxant given the day before (the action may be cumulative), intestinal bleeding, chronic pulmonary disease, disease of the liver or kidney, respiratory deficiency, Addison's disease, and any respiratory or cardiac embarrassment.

COMPLICATIONS

Complications attending the use of muscle relaxants include:

1. Respiratory depression (peripheral or central), sometimes amounting to apnea.
2. Fall in blood pressure (with large doses).
3. Bronchospasm; curare also affects preganglionic transmission and may cause histamine release with occasional blood pressure fall and bronchiolar spasm.
4. Mucosal hemorrhages in the intestinal tract, with

extremely large doses (bloody diarrhea in dogs).

5. Cumulative effect.

6. Mucus (salivation).

7. Hiccough.

8. Some transient residual paralysis of the ocular muscles.

DIFFERENCES AMONG RELAXANTS

Several differences exist among the various relaxants, and include the following:

1. The older agents may occasionally produce bronchospasm and histamine release. Bronchospasm does not occur often with clinical doses, and is reported not to attend the use of the newer (synthetic) agents; pure d-tubocurarine probably does not cause bronchospasm and in clinical dosage does not liberate histamine in significant amount.

2. Non-synthetic drugs include intocostrin, d-tubocurarine, and dimethyl tubocurarine. Synthetic agents are syncurine, mytolon, succinylcholine, flaxedil, mephenesin, and laudolissin.

3. Antidepolarizing relaxants include flaxedil, intocostrin, laudolissin, tubocurarine, and dimethyl tubocurarine. Depolarizing drugs are syncurine and succinylcholine. Mytolon is reported to occupy an intermediate position and may do both.

4. Flaxedil may produce a tachycardia and a blood pressure rise. Succinylcholine may cause muscle fasciculations, dilatation of the pupil, rise in blood pressure and in pulse rate; it is probably not well to mix it with Pentothal because of the effect on the succinylcholine of the pH of Pentothal solutions. Tachyphylaxis to the curarizing effect of syncurine has been reported in man. Mephenesin may produce hemolysis and hemoglobinuria, albuminuria, and irritation at the site of injection. Syncurine may cause muscle twitching. Mytolon is red; its use may be accompanied by salivation. Erythroidine usually brings about a blood pressure fall. An initial injection of d-tubocurarine may diminish the relaxing effect of a later dose of syncurine. Intocostrin is not miscible with Pentothal.

5. The response to antagonists has been referred to above.

6. The site and mode of action of the various agents have been described.

7. The duration of action is long for intocostrin and tubocurarine, intermediate for dimethyl tubocurarine and mytolon, short for syncurine and flaxedil, and ultra-short for succinylcholine.

Approximate (initial) adult doses of agents used in this field are as follows:

1. Dimethyl-tubocurarine. 3 or 4 cc.

2. Flaxedil. 3 or 4 cc. The concentration is 20 mg./cc.; the dose is usually given as 1 mg./kg. or 1 cc./45 lbs.

3. Intocostrin. 3 or 4 cc.

4. Myanesin. 5 to 10 cc. The concentration is 10 percent; the dose is 500 to 1000 mg.

5. Mytolon. 2 to 3 cc. (3 mg./cc.).

6. Neostigmine. 0.5 (1 cc. of a 1:2000 solution).

7. Succinylcholine. 10 to 30 mg. (½ to 1½ cc. of the 20 mg./cc. solution). For long cases, 400 mg. of the 20

mg./cc. solution can be added to 250 cc. of saline or glucose; or 500 mg. of the 50 mg./cc. solution can be added to 500 cc. of fluid. A 0.2 percent has been used, of which 20 to 120 drops are administered per minute.

8. Syncurine. 2 to 2½ mg. This used to be contained in 1 to 1¼ cc.; the strength is now 1 mg./cc., so that the dose would be 2 to 2½ cc.

9. Tensilon. 10 mg. (1 cc.). Two or three cc. are sometimes given.

"Let's make the best of it. Let's try to imagine the operation being performed in a snow storm during an earthquake."

10. Tubocurarine. 3 or 4 cc. The concentration is 3 mg./cc.

11. Laudolissin. 30 mg.

Relaxation of muscles can be obtained by members of a group of drugs other than curare and its modifications. These drugs (1) are newer, (2) are synthetic, (3) are free from histamine release, (4) do not respond to the usual antidotes, (5) are depolarizing, and (6) are short-acting; flaxedil is an exception to some of these, since it is antidepolarizing and responds to the usual antagonists. Fasciculations reported for succinylcholine and infrequently for syncurine may be due to the fact that these substances do not prevent depolarization and initial contraction, but obtain their effect by persistent depolarization. There does not appear to be any respiration-sparing property of any single relaxant to give it a significant superiority over all other agents. The respiratory muscles are last to be paralyzed with clinical dosage; the aim of the anesthetist is simply to administer enough to relax the abdominal muscles and at the same time to avoid giving enough to depress respiratory activity. Both long-acting and short-acting relaxants are commonly used at this time. Advantages of short-acting agents are due to the controllability resulting from the short duration of relaxation produced; it is something of the difference between single-shot and continuous medication. Users of curare-like preparations maintain that it is simpler to inject 3 or 4 cc. during induction and 1 or 2 cc. an hour later, while continuous drip administration may require the injection of an undesirable large amount of fluid intravenously.

The O.R. Problem Clinic

by EDITH DEE HALL, R.N.

Four Aspects of Good Supervision

● To supervise means to oversee and direct the performance of others. However, the operating room supervisor finds herself functioning in the role of manager as well.

Upon her shoulders rests the task of maintaining the best possible working conditions conducive to the welfare of the patient, the service of the surgeon, and job satisfaction for the personnel. All supervision should be humanized as well as systematized. The operating room supervisor, with her many responsibilities and complex problems, should be aware of this fact, and recognize her need for the necessary courage and understanding.

It is encouraging to find that the autocratic type of supervisor is disappearing from our midst. But this does not mean that she is being replaced by one who is lax and less exacting. In no other field of our profession is there less room for a person of this type than in a department in which surgery is being performed. Laxity which might go unnoticed, or be tolerated for a short time elsewhere, could prove disastrous in the operating room. We are in need of well-trained nurses who supervise intelligently, maintain dignity, and remember to act human.

Our educational leaders today, with their studies of human relations, planning, organizing, and the need for change, have made valuable contributions to the art of supervision. By making a sincere effort to utilize the teachings, we can normally expect gratifying results.

In order to develop a guide toward this end, the requirements for supervision may be grouped under four general headings: (1) attitude and atmosphere, (2) ability, (3) knowledge and skills, and (4) plan of action.

ATTITUDE AND ATMOSPHERE:

- Willingness to lead and direct
- Genuine liking for job
- Flexibility and ability to adjust to others
- Making an effort to like people
- High degree of tolerance
- Creation of an atmosphere free of fear or pressure
- Consciousness of equity
- Honest appreciation of workers, and endeavor to live up to praise
- Being a good listener—attentive, alert, friendly
- Being a good counselor—approachable and human
- Pleasant, low-pitched tone of voice
- Tact and courtesy

ABILITY TO:

- Organize and manage
- Stimulate, coordinate, and adjust
- Radiate confidence and sincerity
- Function smoothly
- Teach and give instructions
- Communicate with clear and definite understanding and with warmth and friendliness
- Encourage group expression and participation
- Provide for growth and development
- Make mature use of authority
- Delegate necessary authority
- Develop depth of supervision through training of assistants and encouraging advancement by education
- Make decisions quickly
- Delegate responsibility
- Keep calm in emergencies
- Prevent tension and conflicts

KNOWLEDGE AND SKILLS:

- Awareness of responsibilities to administrator and nursing director
- Knowledge of policies and rules of the hospital
- Understanding of relationship to other departments
- Familiarity with entire operating room unit, including:
  - Teaching program
  - All procedures and skills
  - Records and reports
  - Equipment and economy of supplies
  - Economy of time and effort
  - Simplicity and standardization
- Skill in thinking and evaluating
- Skill in giving orders
  - Be sure order is necessary and instructions are complete
  - Give order by request, not command, except in cases of emergency
  - Ask questions, suggesting action indirectly
  - Ask for opinions

PLAN OF ACTION. This involves:

- Job analysis of entire department
- Carefully planned and clearly defined objective, with adequate guides to action

Teaching plan

Development of productive teams

Problem solving through:

- Staff conferences
- Use of surgical committee
- Use of technic committee
- Personal interviews, counseling, and guidance
- Consultation with director of nurses, when necessary

Cooperative planning with staff members

Job satisfaction. This includes:

- Complete understanding of functions and duties
- Knowledge of hours, wages, holidays, etc.
- Recognition and security
- Sense of unity
- Right to be heard
- Personal growth and achievement
  - Interest in each individual by supervisor
  - Fairness and impartiality

Checking worker performance

Prevention and correction of faults and errors.

A good supervisor needs to be a successful coach, realizing that it is better to prevent errors than to correct them after they are made. The need and value of having a leader who has an understanding of human nature should be appreciated. Such knowledge and its human application are the foundation upon which the structure of supervision is based. Finally, good supervision implies setting a good example.

Draping Methods Should Be Inspected

DRAPING, one of the oldest procedures used in the operating room, is also one of the most important. There have been relatively few changes in drapes over the years and we find that methods used 30 years ago are still good today.

This fact, however, should not discourage us from taking a critical look at all drapes used in the operating room. We have a responsibility to keep the patient safe from infection, exposure, and other hazards. Increased efficiency and service result when an honest effort is made to revise and improve drapes.

In our study of draping procedures we should consider the amount and kind of drapes needed. Drapes should be simple and efficient. (Large, bulky drapes present a problem in sterilizing and handling even to the extent of being unsafe.)

Drapes should be made of good quality muslin which is durable and which facilitates penetration of steam during autoclaving. Heavy twill and canvas materials should not be used because they hamper sterilization. Although unbleached muslin wears longer, colored muslin has become popular because it prevents glare and also aids in photography.

The majority of drapes are sheets and towels. Special drapes are usually made in the sewing department of the hospital. These should have a wide margin of double thickness material around the surgical field. When used alone, sheets should be folded double.

Preparation and use are simplified when sheets and towels are in two or three sizes rather than many sizes. This also holds true for special drapes which should be designed to serve for several types of operations. For example, a laparotomy sheet can be used not only for abdominal surgery, but for a nephrectomy, laminectomy, pilonidal cyst, etc.

Draping methods should be well planned and taught to the operating room staff. These methods should be standardized as far as possible, but a certain amount of flexibility should be expected and permitted. Unfortunately our patients do not come in a uniform size, and our routine must be changed to suit the occasion.

One question which is often asked is: Should the surgeon be responsible for draping his patient? If a surgeon wishes to do his own draping, it should be his privilege, but there is no reason to add to his responsibilities by expecting him to take over that which is really a nursing procedure.

In the draping process it is often advantageous and sometimes necessary for a physician to assist, particularly when there is only one nurse scrubbed or when the drape is difficult. The suture nurse is responsible for the sterile field. It is her duty to reinforce drapes whenever necessary. She should be alert for misplaced drapes, exposed areas, and wet surfaces. Good draping is a mark of efficiency. A surgeon either gains or loses confidence in his suture nurse according to the skill or lack of skill she displays in draping.

Points to Remember

1. Plan ahead and have drapes ready
2. Know your drapes, avoid confusion and loss of time
3. Start draping by covering main part of patient
4. When applying, hold drapes high and away from gown
5. Drape with precision, being careful not to drag drape over operative field
6. Protect sterile gloves when draping
7. Secure drapes with towel clips
8. Keep drapes smooth and neat
9. Place folded edge toward field of operation
10. Reinforce whenever necessary
11. Reinforce before operation if need is indicated
12. Always change drape if there is the slightest question of contamination

O.R. Nurse Needs Knowledge of Skin Grafts

● Although skin grafting is employed most extensively by those who specialize in plastic surgery, it is often a necessary procedure for the general surgeon. Nurses and others who scrub for all types of operations should have a knowledge of the various types of grafts used and some of the details involved.

Skin grafting is the placing of bits of epidermis or larger strips of the entire skin on a denuded surface in order to supply defects, or to stimulate a new growth of epidermis. There are two classifications of skin graft: (1) free grafts, in which the blood supply is completely severed from the original site, and (2) transplants, in which a pedicle is temporarily retained for nutrition of the graft.

Those suffering from loss of skin and tissue by burns, tumors, trauma, and disease depend largely upon free grafting or the shifting of neighboring or distant skin.

TYPE DEPENDS UPON DEFECT

The type of graft employed depends upon the nature of the defect to be remedied and the location and function of the affected part. Every graft is a problem in color, texture, and function. The first two conditions are most easily satisfied by using skin from a surrounding part.

Unfortunately, this is not always possible. The cosmetic aspect is complicated by the functional one. If, for instance, the defect is in the finger tips, the graft must not be so thick as to interfere with the sense of touch. On the other hand, where sensory function is not at stake, the graft should be thick enough to protect the subcutaneous structures against external pressure.

There are several accepted methods designed to meet the various conditions for which grafts are required. Definitions and short descriptions of each are as follows:

Pinch (Reverdin)—the grafting of small bits of epidermis on the granulating surface to promote healing.

Usually this type of graft is used to cover small areas and the skin is often taken from the abdomen or thigh. Small bits of skin are pinched or picked up by the use of a Keith needle or fine forceps, and are cut free with a razor blade. The small bits of skin are placed close together on the area to be grafted. They are held in place by a moist pressure dressing.

Split Thickness (Thiersch) — the grafting of films of epidermis shaved off in strips and applied to the surface after shaving down the granulations.

This graft provides the most uniformly successful procedure, in which a superficial layer of skin is taken from any part of the body. Thiersch grafts have great value in the repair of extensive burns or other large wound surfaces. They do not require any blood supply to "take," since they consist only of epidermis, and a large area can be transferred at one time.

One of their main disadvantages is that the skin taken does not always harmonize with that of its new surroundings. The contrast is not so important on concealed parts of the body but it cannot be ignored on the face. Time

frequently obliterates the difference in color or renders it less conspicuous.

When rapid healing of wound surfaces is sought, the good features of the Thiersch graft counterbalance the disadvantages. Around the eye-lids, nose and mouth, about the joints and on moving parts like the neck and axilla, it averts the threat of deep scar formation with consequent traction and displacement.

FULL THICKNESS GRAFTS

Full Thickness (Krause or Wolfe)—a means of grafting of large strips of entire thickness of skin but without any subcutaneous fat.

Full thickness grafts are sometimes preferred when the region of the defect is subject to external pressure and adequate resistance is needed to prevent injury to the underlying muscle and bone. They are the method of choice if the part is one that is vigorously used, but the procedure is not uniformly as successful as the Thiersch graft. The greater thickness requires a vigorous circulation and, unless the graft is penetrated promptly by the blood vessels in the surrounding wound, it is apt to slough or die.

Pedicle or Migrating Grafts—full thickness skin graft which is transferred after the blood supply has been established in the graft itself where the pedicle is retained.

This graft is used when a full thickness graft is desired from a distant part and it is not thought desirable to risk the vitality of the transplant by severing completely from the body. The transfer is made in successive stages. Skin from the abdomen, for example, is grafted upon the forearm, remaining attached to its original site by a pedicle until it has "taken" in its new location. The pedicle is then severed and the process repeated to transfer the graft to its final destination.

POSSIBLE COMPLICATIONS

Complications such as infection, sloughing caused by trauma, scarring, and keloid formation may follow skin grafting. Whether the method be mere excision, Thiersch grafts, full-thickness transplants, or migrating flaps, success hinges on the skill and specialized experience of the surgeon and strict asepsis of the operative environment. With a knowledge of what is to be done, the nurse plays an important role by maintaining routinely the highest possible standards of aseptic technic.

PROBLEM CORNER

Q. Should surgical conferences be given for the operating room staff or instrument nurses to keep them attuned to progressive surgical procedures and their changes? If so, who will decide what the agenda should contain and how often the conferences should be held?

A. Yes, conferences of this kind should be beneficial and stimulating. They provide the nurse with information that would otherwise take a great deal of time to acquire. Nurses also have an opportunity to ask questions and discuss cases they have seen. The conferences should be held at least once each month and the program should be scheduled well in advance so that other plans will not interfere. Staff nurses should either plan together or

have their own committee to be responsible for selecting subjects, inviting surgeons to speak and arranging for the time and place. By having such a committee more interest is stimulated. In almost all instances surgeons are willing and anxious to help nurses who have a sincere interest. Better relations are developed and better service results. Nurses should always be encouraged to promote on-the-job education.

Q. The system of rotating staff nurses on the various services has become more or less of a problem in our operating room. All of my staff nurses who scrub for operations, with the exception of one, wish to rotate but we have several leading surgeons who do not approve. How is this usually managed in other hospitals? We do not have a training school.

A. The general rule in hospitals of average size is to rotate the nurses on the various services. In small private hospitals with only a few surgeons the custom varies, and of course we sometimes find a surgeon who employs his own scrub nurse.

It is only natural for a surgeon to want the same nurse all the time and we all know his reasons. However, with scrub nurses at a premium the surgeon must make some sacrifices. He is usually willing, when faced with the facts, to do his part, realizing that the operating room supervisor merits his cooperation if he has confidence in her ability to manage the department.

The supporting facts are that rotating equalizes the distribution of work; it helps to avoid confusion when nurses are absent due to vacations, illness, and other emergencies; it stimulates interest in the department as a whole; and helps to prevent petty jealousies, friction, possessiveness, and favoritism. A much stronger and more effective staff is developed when all members have a working knowledge of the different services.

Q. In the maintenance of supplies and equipment, I am constantly confronted with the problem of losing surgical needles. I have tried various means to prevent this loss, but results have been unsatisfactory. Have you any suggestion?

A.—One method which I observed recently in a hospital, comes to my mind. Each nurse was given, as her personal property, a small needle book made of white flannel. Each book contained a complete set of needles for general surgery and was marked by a different color. These books were autoclaved with the instruments, and each nurse was responsible for the care and replacement of needles and for using no other book than the one originally assigned to her. I was interested in this method and was told by the operating room supervisor that she found it most satisfactory.

Q. Should the operating room supervisor be given authority to institute changes in supplies and procedures in the operating room?

A. Yes, if the changes are comparatively simple or definitely a nursing procedure. However, if the change directly affects members of the surgical team it should be discussed and approved at a surgical conference or committee meeting with the operating room supervisor present. Supervisors should be trusted to use good judgment in keeping up with new trends and making changes to improve technic and the quality of service.

Operating Room Nurses Hold First Tri-State Meeting

About 350 operating room nurses attended the first operating room nurses' section of the Tri-State Hospital Assembly, held in Chicago May 4 and 5. Above: George J. Thomas, M.D., director, departments of anesthesiology, St. Francis and Medical Center Hospitals, made members of audience jump and hold ears when he gave a demonstration on explosion hazards in the operating room.

Trading Post of Ideas

• One of the most popular sessions at the Conference of Operating Room Nurses during the Tri-State Hospital Assembly was the "Trading Post of Ideas," at which nurses from many different hospitals presented ideas which they have found helpful.

In-Service Training by Regular Conferences

Mary Beth Murphy, R.N., Operating Room Supervisor, Highland Park (Mich.) Hospital—Every hospital should have an educational program to keep operating room nurses informed of changing technics and to widen their learning and teaching capacity. Every nurse is a teacher, whether she realizes it or not.

Weekly or even bi-weekly "get-togethers" in the nurses' conference room have proved satisfactory for in-service training. The nurses are comfortable and even look forward to this period of relaxation. Some hospitals find afternoon meetings convenient; others prefer early morning caucuses. The time depends largely on the schedule.

These meetings are constructive, instructive, and democratic. Any plan or new idea that any nurse wishes to try may be discussed with the group and given a trial. Every nurse should be made to feel that she is an integral part of the whole plan. If a friendly, democratic atmosphere is prevalent at all times, she has a sense of belonging, which is one of the fundamental principles of democratic administration.

One hour is a reasonable length of time for these gatherings, and if the nurses know the time beforehand they will have the business ready to present and discuss.

Matters presented at these meetings are:

(1) Ideas which might help to bring about a more standardized, simplified, yet efficient method for any procedure used.

(2) Individual nurses' problems, such as personality conflicts with the surgeon or house staff. The nurse involved may benefit by learning how her co-workers cope with this situation.

(3) Information on new instruments. Instruments are displayed at these meetings, so that nurses will be acquainted with them and have them ready for use as they are needed or requested by the surgeon.

(4) Role of all nurses in teaching. The chairman of the group, the operating room supervisor, tries to impress upon her staff that much teaching is accomplished by each nurse who guides one or more students in the room in which she is in charge. The circulating nurse is considered the team leader. She guides and directs the activities in one room, including the over-all organization for the day's schedule and the individual requirements for each operation.

(5) Review by one nurse of an operative procedure of her choice in regard to the indications, type of anesthesia, and procedure (including the special instruments, types

of needles, suture materials and any other specific equipment). This presents an excellent opportunity for nurses to discuss the principles of a specific operation and to become aware of methods used by different surgeons with similar results. The possible patient complications are also discussed, especially any that may occur while the patient is still in surgery. The reviews are filed and are accessible to members of the group at any time. The nursing staff should have some choice in selecting individual surgeons to give informal talks on different patient conditions and operative procedures, as they themselves feel the need for further teaching.

Interest among the nurses is readily aroused when they are learning something that may be integrated constantly in the daily work routine, and they appreciate the importance of the role of an efficient operating room nurse when they see the results of their own efforts.

A recorder should keep minutes, which should be available for any nurse to read.

These meetings or informal gatherings should tend to create a team spirit and working relationship among the nurses which should make for safe, efficient nursing care, satisfactory service to the surgeon, job satisfaction and professional growth for the individual nurse, and good interpersonal relationships for all in the department in today's smooth-running operating room.

Training Technicians in a Small Hospital

Lydia Miller, Operating Room Supervisor, Memorial Hospital, Fairfield, Ill.—Our small hospital (84 beds) is in a community of 7,000 population. Because of a shortage of registered nurses, we had to resort to training technicians. Of the five members of our operating room staff, I am the only graduate nurse.

The hospital is in its fourth year of operation. During that time I have trained six technicians. Four are working now, and two are on call each week.

When a visiting doctor comes to our hospital, I usually scrub for him. However, our staff doctors accept the technicians and admit they do a good job. The doctors also help in the training program by giving constructive criticism.

The age range for technicians is from 20 to 30. Training is on the job. During the first two weeks an orientation course is given to acquaint the trainee with the difference between sterile and non-sterile supplies.

During the first week the new technician observes how linens are folded and the different kinds of packs used. Information is kept to a minimum, so that it will be easy to remember. I keep a file on the amount of linens which go in each pack, the number of packs kept daily, and the individual packages. The new technician studies the card system and also learns where supplies are kept.

In the second week she helps to wash and dry instruments and learns their names. She does this for approximately four weeks, and also helps one of the more experienced girls to put up packs, change solutions, and autoclave. She learns surgical dusting and the cleaning of cabinets.

After eight weeks she is learning to circulate and practicing putting on gown and gloves. She has to know a little bit about everything in the operating room before

Looking over the program before going in were (l. to r.): Amelia Louise Catalpa and Marie Gomez, postgraduate students in the operating room, and Luella E. White, staff nurse, operating room, all of St. John's Hospital, Springfield, Ill.; Helen Lane, O.R.S., University of Illinois Hospital, Chicago; and Audre E. Price, O.R.S., Henrotin Hospital, Chicago.

she gets a scrub lesson—because once she learns how to scrub, that's all she wants to do from then on.

Usually she gets her first scrub lesson about three months after beginning training. Then she starts to scrub with the help of a senior aide. Her first scrubs are for minor cases. Then she helps with major cases for approximately two months. After five months she usually can manage major cases, such as appendectomies, hernias, and perineorrhaphies.

Doctors' routines are easy to remember, since we have only eight doctors, but I do keep a file system on them. While aides are learning, cards are kept on the wall.

The operating room supervisor takes care of the sponge count. Technicians are under continuous supervision.

A Method for Segregation of the Entire Small Intestine*

By the late Frank H. Lahey, Lahey Clinic, Boston

● In the course of many operations on the colon, for carcinoma, which require extensive removal of colon segments, or in the course of colectomies for ulcerative colitis involving the removal of all of the colon down to the sigmoid, I have often been greatly aided by complete evisceration of the small intestine. In doing this, I have been accustomed to eviscerate the small bowel into large, wet, warm pads of gauze. This method has not been completely satisfactory because loops of bowel escape from the pads, the pads become cool, and, furthermore, gauze is not the best material to have in contact with the delicate visceral peritoneum over a considerable period of time. For this reason I had two bags made, one large and one small (Fig. 1), one to receive the small intestine of a large adult and the other the small intestine of a thin, small adult or of a child. These bags have a double drawstring at the open end so that, with all of the intestine within the bag, the neck of the bag may be pulled together tightly enough to keep the intestine in place but not tightly enough to interfere in any way with the blood supply.

With all of the small intestine segregated into such a bag with the neck drawn up, it may be hung either to the left or to the right of the abdominal incision, as desired, so that the colon or the stomach may be worked on from either side (Fig., Page 114).

This bag of easily stretchable rubber is smooth, and it is thick enough to hold heat within it. In any surgical condition in the abdomen that is not of an inflammatory

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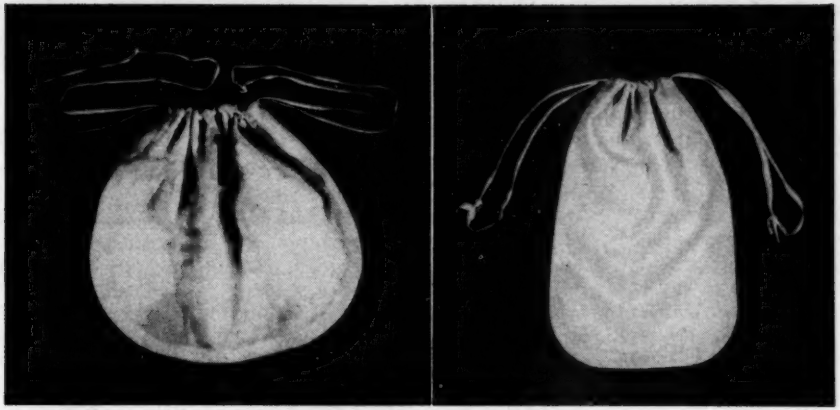


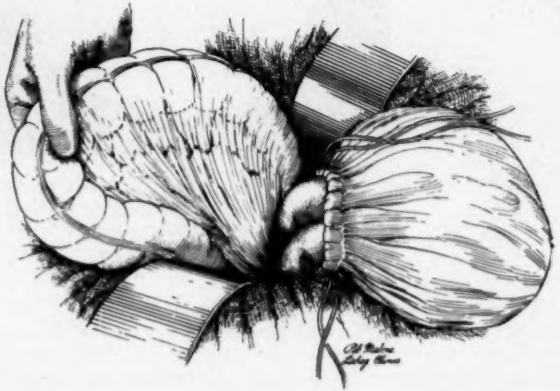
Above: Fig. 1. These photographs illustrate the large and the small bag; the large for large adults with a large mass of small intestine, and the smaller bag for children and small adults.

character and not of a type that involves the small intestine, the use of this bag makes it possible to obtain operating conditions and exposures comparable with those conditions which would be obtained on a cadaver in which all of the small intestine had been removed.

These bags have now been employed a sufficient number of times so that one can say that they have many advantages and apparently no disadvantages. It is important to stress that the surgeon must be extremely careful in pulling the drawstrings up at the neck of the bag so that the neck is not closed so tightly as to produce contriction of the blood supply in the mesenteric roots of the bowel segregated in the bag. On the other hand, the drawstrings must be pulled together with reasonable tightness, or troublesome loops of small bowel will escape from the bag and perhaps interfere with the clearness of the field.

A simple way to get all of the small intestine into the bag is to grasp the mesenteric root of the small intestine within the abdomen in one hand, with the jejunum at one end of the grasped mesenteric root and the ileum at the other. They can all then be easily manipulated into the bag and the drawstring pulled up around the root of the mesentery.

This is a simple and apparently a safe method of obtaining the exposures which go with complete evisceration of the small intestine out of the abdomen without the disadvantages of heat loss and peritoneal irritation which accompany small intestinal evisceration without the bag.



Right: Fig. 2. This illustration shows how all of the small intestine from the jejunum to terminal ileum can be segregated into this rubber bag with drawstring closed at the neck so that the colon can be worked on without the exposure being interfered with by the small intestine.

Radical Head and Neck Surgery Technics

By Barbara Volpe, R.N.
Operating Room Supervisor
Manhattan Eye, Ear and Throat Hospital, New York City

● Radical head and neck surgery is performed frequently in Manhattan Eye, Ear and Throat Hospital and the importance of the nursing functions in preoperative, operative, and postoperative care cannot be stressed too definitely. Only with all members of the teams working together can the patient receive the type of care he desperately needs.

Nurses skilled in the management of these patients are familiar with signs and symptoms and the procedures, methods, and equipment to prevent serious complications. All floors are adequately equipped, but operating room nurses do not hesitate to supply equipment in case of emergency. Thus, because of a carefully worked-out plan, the patient has constant care and a much better chance of survival.

The credit for the development of neck dissection as a curative operation for cervical metastasis belongs mainly to George Crile, Sr., M.D., whose investigations concerning this problem began in the latter part of the nineteenth century. He designed and practiced a systematic operation of neck dissection on an anatomical basis and published his first report in 1906. He actually attempted complete removal of the cervical lymphatics.

Crile recommended anesthesia by tracheal intubation, complete removal of the sternomastoid muscle, the internal jugular vein, and all of the areolar and lymphatic tissue of the various triangles of the neck. He was one of the first to warn that permanent ligation of the common or internal carotid artery was a dangerous procedure, and he called attention to the high mortality due to "cerebral softening."

Crile also advocated at that time, and occasionally practiced, resection of the floor of the mouth and the tongue in combination with neck dissection. He emphasized that the cure rate for the operative removal of cervical metastatic cancer could be considerably improved if a radical operation were performed, rather than a partial procedure in which the veins and muscles were not removed.

Throughout the first half of the twentieth century many have been and still are in favor of more conservative operations, such as submaxillary dissection, dissection to the level of the omohyoid muscle, or preservation of the sternomastoid muscle, internal jugular vein, and spinal accessory nerve.

Radical neck dissection refers to an operation to remove as thoroughly as possible from the lateral and anterior

aspects of the neck, the lymphatics (lymph nodes and lymphatic vessels) that are likely to be involved by metastatic cancer. The field of operation should begin above at the lower edge of the mandible and extend to the level of the clavicle below.

Anteriorly, the dissection should begin in the mid-line of the neck and be carried posteriorly to the anterior edge of the trapezius muscle. The procedure should include the removal of the sternocleidomastoid and omohyoid muscles, the internal jugular vein, and the submaxillary salivary gland, *en bloc*.

The operative mortality for radical neck dissection per se in present-day surgical practice should not exceed 1 to 2 percent. The published mortality rates for neck dissection vary from 3.7 percent to 12 percent. When neck dissection is combined with excision of a primary lesion in the mouth, the mortality should not exceed 4 to 5 percent.

Cervical metastasis or recurrence after neck dissection, if any, usually becomes evident within the first few months or a year following the treatment of the primary lesion. Of 303 cases the five-year cure rate of neck dissection in this series of cases was 34 percent. The prognosis for cure following neck dissection appears to be rather constant through the fourth, fifth, sixth, and seventh decades. Neck dissection should not be denied to any patient for age alone.

The prognosis for cure is the same for males as for females. The prognosis is much better for cancer of the lip and intrinsic larynx than for other forms of head and neck cancer. In those cases in which there were no recurrences following neck dissection, the cure rate in 90 cases was 86 percent. It is significant, however, that there was some salvage even after local recurrence in 12 cases—11 percent. The credit for cure for these recurrences was divided about equally between surgery and radiation therapy.

RADICAL NECK DISSECTION

(For removal of submental or submaxillary or complete removal of the glands of the neck)

Draping the Patient:

Place patient on table with shoulders 3" above break of head rest, so that the head may be raised and lowered.

Place a large sheet folded in half with two dressing towels which are placed 12" from fold of sheet, under the patient's head, well down under the patient's shoulders, with the towels just below the nape of the neck. Bring the top towel, which has a 3" cuff, up over patient's forehead, and clip at mid-line. Fold loose edge of towel under patient's head. Remember, when the patient is under general anesthesia, to extend his head so that the chin is up, thus facilitating a better airway.

Place two large sheets, with a small cuff facing up, over the entire body of the patient, being careful to unfold and not drag the sheets over the patient. Make sure that the upper edge is well up on the painted operative area.

First, place a green clinic sheet (36" x 48"), with a 3" cuff turned under, over the patient's right shoulder. Second, repeat this drape for the left shoulder. Third, place a green clinic sheet, with a 3" cuff turned under, over the patient's face down to the chin. Fourth, place a green clinic sheet, with a 3" cuff turned under, over the patient's chest.

Note: Always place the folded edges of the green sheets well on the

painted operative area. The sheets are then sutured in place with 2-0 black silk. A crushed towel is placed on either side of the patient's neck to absorb blood.

Set-up:

Marked medicine glasses for novocaine 1 percent, and peroxide, cocaine crucible, small bowl for tincture of Zephiran, and one plain medicine glass. One medicine dropper

- 6 Long sponge forceps for prep
- 10 Towel clips
- 2 Bard-Parker handles with #20 blades. Use first one for skin incision and then discard
- 2 Bard-Parker handles #3 with #10 and #11 blades. Add extra knife blades
- 1 MacKenty elevator
- 2 Short curved Mayo scissors
- 1 Lahey scissors with curved blunt tip
- 1 Metzenbaum scissors with curved blunt tip
- 2 Suture scissors
- 2 Mouse tooth forceps
- 1 Graefe fixation forceps without catch
- 1 Plain tissue forceps
- 1 Bayonet forceps
- 2 Russian forceps
- 16 doz. curved Halstead mosquito forceps
- 3 doz. curved Rochester-Pean (Kelly) forceps 5½"
- 6 Wide Allis forceps
- 2 Green thyroid retractors (large loop)
- 2 McBurney retractors (small loop)
- 2 Four prong rake retractors
- 2 Large smooth retractors
- 2 Skin hooks
- 1 Surgical probe
- 1 Grooved director
- 1 Trousseau tracheal dilator (in case of tracheotomy)
- 2 Aneurysm needles or ligature carriers—left and right
- 2 Collier needle holders
- 2 Ochsner needle holders 6"
- 4 Curved Rochester-Pean (Kelly) forceps especially designated for peanut sponges
- 1 Luer-lok syringe 5 cc.
- 2 Luer-lok needles, 1-inch 23-gauge
- 1 Hypodermic syringe with 2 needles ½-inch 23-gauge
- 1 Rochester-Pean (Kelly) forceps especially designated for nasal feeding tube
- 2 Nasal suction tips — assorted sizes
- 1 Yankauer mouth suction
- 1 Medium Denhart mouth gag
- 1 Ether hook
- 1 Medium Weeder tongue depressor
- 1 Adult Jennings mouth gag
- 2 Assorted suction catheters in case of tracheotomy; #18 or #20 rectal tube for nasal feeding tube (before use run water through the tube to make sure it is patent). Orangewood stick stopcock for nasal feeding tube. Tube of Vaseline and lubricant
- 2 Penrose drains with safety pins. Size of drain depends on the doctor's wish — use ½-inch unless otherwise specified

Dressing:

- 2 Long neck rolls
- 8 x 4 gauze sponges
- Split 8 x 4 sponge for around drain
- Mechanics waste
- 3" elastoplast
- 1" and 2" adhesive to anchor ends of elastoplast

Note: Always be prepared for a tracheotomy.

Nurse Anesthetists Convene in Chicago

● *From the 21st annual convention of the American Association of Nurse Anesthetists, which met in Chicago, Sept. 13-16, 1954, here are abstracts of some of the important papers.*

What Anesthetists Should Know About Heart Conditions

Samuel Rosenthal, M.D., Assistant Professor of Medicine, Marquette University School of Medicine, Milwaukee, Wis.—Common forms of heart disease which the anesthetist encounters are: mitral and aortic stenosis and insufficiency; hypertensive heart disease; coronary arteriosclerosis; congenital heart disease, and thyroid and syphilitic heart disease (less common).

Before giving an anesthetic to a heart patient, the anesthetist should check:

(1) The history sheet for an enlarged liver, shortness of breath on rest or effort, swelling of the ankles, cough, sleeping on several pillows at night, and taking of digitalis or injections to help pass urine.

(2) The physical examination for rales, cyanosis, high blood pressure, irregularity of heart.

(3) The laboratory examination for red blood count and hemoglobin, electrocardiogram, chest x-ray, and BMR.

The clinical history, not the ECG, determines whether the patient is a good risk or not. The ECG is of value in determining the type of arrhythmia or irregularity present. A chest x-ray may show an enlarged heart and pulmonary congestion or deviation of trachea by thyroid or other mass. An elevated BMR suggests the need for extra oxygen.

If an operation must be performed in spite of congestive failure, the anesthetist should (1) give no saline solution during the operation; (2) avoid giving large amounts of fluid during the operation (1,500 cc. generally is sufficient); (3) avoid large doses of spinal anesthetic or a high spinal.

Adequate oxygen should be administered for the duration of anesthesia, but changes in concentration of oxygen from high to low should be avoided. Blood pressure should be taken every five minutes. A rise denotes oxygen want or carbon dioxide excess.

Cyclopropane should not be used when adrenalin has been administered with local novacaine anesthetic, because of the danger of arrhythmia. Ethylene and ethylene ether mixtures are safe for cardiac cases if oxygen content is adequate. Spinal anesthesia should be avoided.

Anesthesia and Airway Problems In Polio Patients

E. Trier Morch, M.D., Professor and Director of Anesthesia, University of Chicago School of Medicine—

Poliomyelitis cases can be classed as (1) those with normal respiration; (2) those with moderate respiratory difficulties, and (3) those with severe respiratory difficulties.

When respiration is normal, the patient is no different from any other. When moderate difficulties exist, avoid depressants and use a local and ether, with intubation when in doubt. In severe cases, keep the patient in the respirator during induction and intubation, and breathe for him at all times.

Relaxants are rarely necessary, because the patient is already relaxed by the disease. Disinfect equipment by boiling, autoclaving, antiseptics, and ultraviolet light. The virus is easy to destroy.

Often the most critical patients have the best prognosis, if we can carry them through the first week of terrific danger.

Anesthesia for Geriatric Surgery

Ethelyn McFarland, R.N., and Elaine McMurdie, R.N., Anesthesia Department, Butterworth Hospital, Grand Rapids, Mich.—A series of 748 cases in a five-year period, with the patients 70 years or over, was analyzed.

The patients suffered the usual degenerative diseases. Hypertension and heart disease were the most common. Emphysema frequently associated with asthma, chronic bronchitis, and bronchiectasis were the usual respiratory complications.

Premedication was usually Demerol and atropine or scopolamine. Barbiturates were avoided.

Anesthetic agents and methods were the same used on any adult group, considering the physical status of the patient and the surgery to be performed. In the last three years, combined anesthetics were used more often, especially in the 70-79 age group.

When Pentothal was used in smaller doses than usual for an adult, it could be safely given to patients over 65. There were the usual anesthetic complications, such as laryngospasm, bronchospasm, and arrhythmias. Reflex hypotension was observed and was associated with deep anesthesia on several occasions.

The types of surgery were: perineal, 315; extremity, 121; lower abdominal, 110; upper abdominal, 92; operations about head, 47; miscellaneous, 63. Ninety-one patients received two or more anesthetics.

Two patients died in the operating room, and six others died within eight days. The greatest cause of death was of cardiovascular origin. Four patients had been given nitrous oxide-oxygen-ether, and four, Pentothal-curare nitrous oxide-oxygen.

Induced Hypotension

Donald E. Hale, M.D., Chief, Department of Anesthesia, Cleveland Clinic—Induced hypotension is a safe, valuable, and sometimes essential procedure. Safety depends upon close observation and control, and upon a lowered blood pressure level being maintained as short a time as possible.

Controlled induced hypotension is used for four purposes: (1) to reduce blood pressure and conserve a patient's blood; (2) to provide a clear field unobstructed by blood; (3) to reduce brain edema, and (4) to reduce the tension in large vessels which are being operated upon.

The need for saving blood is indicated by the following average blood loss in some of the standard procedures: craniotomy, 803 cc.; radical mastectomy, 690; thoracotomy, 1,558; operation on bile ducts, 460; nephrectomy, 484, and hysterectomy, 358.

A clear field is especially desirable in intracranial procedures and in the fenestration operation. The reduction of brain edema is of considerable value whenever it is encountered during intracranial surgery.

Hypotension is induced by arteriotomy, spinal anesthesia, or use of ganglioplegic drugs. In a series of 50 cases of hypotension by arteriotomy, the quantity of blood varied from 800 cc. to 3,000 cc.; the average was 1,742. The average fall in mean blood pressure was 43.5 mm. Hg.; the average withdrawal time, 29.4 minutes. The average time the blood remained outside the body was 25.7 minutes.

The dangers of hypotension are the result of the effect of low blood pressure upon different body systems. Therefore, both duration of the hypotension and the levels of the blood pressure must be considered. It is important to have an accurate means of reading pressure at low levels.

Anesthesia for Paraplegic Patients

R. Anthony Tella, M.D., Chief of Anesthesia Service, VA Hospital, Wood, Wis. — As a result of improved technics and introduction of antibiotics, a large number of patients survived spinal cord injuries in World War II. Between 80 and 88 percent of soldiers incurring such injuries returned to paraplegic centers, and there has been a mortality of only two to eight percent.

Only a very small percentage of paraplegics coming to surgery need to be anesthetized. As a general rule, operating procedures below the cord lesion can be completed without anesthesia. One of the main complications of the paraplegic which may require surgery is decubitus ulcer. Such patients who present no tendency to heal under conservative treatment are operated upon. The operation usually entails the radical excision of the ulcer, including oftentimes the underlying bone. Many of these operations are done without anesthetics.

Frequently, however, patients are near panic on being told they are going to the operating room. Our procedure has been to sedate them well, using Nembutal and administering oxygen during the operation. Nembutal is given the night before and also in the morning preoperatively. If this fails, then a drip solution of Pentothal is given. Blood is administered if necessary, mostly because of anemia and hypoproteinemia.

One of the grave complications in paraplegics undergoing operation is paroxysmal hypertension. We have never seen a postoperative cerebrovascular accident provoked by it, but the possibility exists, and we must be on guard.

In our paraplegic series requiring general anesthetics, we found no contraindication for any particular anesthetic agent. We stress careful, skillful administration of the agents used, bearing in mind that these patients often have a low blood cell count and a low hemoglobin. Blood for transfusion should be readily available.

A skit based on Chicago's history was presented at the state dinner by Chicago area anesthetists. Highlight was a full dress "high society" wedding from "when Chicago was young." Members of the cast shown below are, kneeling: John F. Quinn (a Charleston dancer), Argonne National Laboratory, Lemont, Ill., and Esther McDermott (Mrs. O'Leary), Walther Memorial Hospital, Chicago. Standing (l. to r.): Ruth Marks (moderator), West Suburban Hospital, Oak Park, Ill.; Jack Joyce (an Indian), Garfield Park Hospital, Chicago; Rose Aiello (Sophie Tucker), St. Anne's Hospital, Chicago; Marie Niccoli (bride), St. Anne's Hospital, Chicago; John Gramyk (groom), St. Elizabeth's Hospital, Chicago; Mary Duray (maid of honor), West Suburban Hospital, Oak Park, Ill.; Lillie Stuffelbeam (bridesmaid), St. Francis Hospital, Blue Island, Ill.; and Matilda Welinske (bride's mother), Resurrection Hospital, Chicago.

TEAMWORK IN THE OPERATING ROOM

● Teamwork, whether or not it is recognized as such, has existed in the operating room perhaps longer than in any other department of the hospital. The fact that no surgeon works entirely alone results in a group or team working together.

How well these teams function and the degree to which they are developed depends upon a number of factors. First there must be cooperation and a well-organized plan. There must be complete understanding and acceptance of the plan by all members of the staff. These requisites, combined with an adequate staff and sufficient material supplies, facilitate teamwork. The economy of time and increase in service prove the value of the plan when it is carried into effect.

The following plan was observed in a hospital of approximately 300 beds with the operating rooms, the central supply, and the postoperative room all on the same floor. The operating room schedule was fairly well controlled, and no pressure beyond good planning was used to force bookings. In this hospital a great deal of radical surgery is performed which obviously reduces the total number of operations but increases the need for teamwork.

The operating room staff consists of the operating room supervisor, her assistant (who functions as a team leader), nine registered nurses, five surgical technical aides (three male and two female), two porters, one floor helper and one secretary. All scheduling is done by the operating room supervisor. The secretary, with few exceptions, takes care of all paper work. Central service prepares and autoclaves all gloves, linen, etc., and the operating room staff takes care of all instruments, needles and sutures. One male technical aide is assigned to transportation each day. It is his duty to transport patients, in their own beds, to the operating room and back to the postoperative room or ward as directed. One male technical aide is assigned, each week, in rotation, to oxygen therapy. He serves the entire hospital.

With four completely equipped operating rooms and four complete teams, it is possible to carry on what is known as the "closed door technic." In other words, members of the team are not allowed to stray away from their positions, with the exception of the leader, who covers all four rooms. If it is necessary for her to attend to two different rooms, the operating room supervisor is called by the interoffice communication system.

The operating room team includes the surgeon, his first and second assistants, the anesthesiologist, the scrub nurse, the circulating nurse and

the team leader. The scrub nurse may be either a registered nurse or a surgical technical aide. The nine registered nurses and five technical aides are taught to scrub or circulate for all types of operations. The team leader must be available during the entire operation. When the patient arrives, she evaluates the nursing care needed before and during the operation, as follows:

a. Comments are checked.
b. Preoperative prep is checked, i.e., proper shave, dentures, proper care of jewelry, money, etc.
c. Catheters and drainage tubing are checked.
d. Blood and IV fluids are checked.
e. Cut-downs are noted and checked.
f. Lindemann needles are checked and stylets kept.
g. Tracheal tubes are observed and obturators checked.

The nursing care in the operating room differs greatly from the care given on the ward. The average stay in the operating room is from one to six hours, and all care must be concentrated in this period. It is most important to give care quickly and accurately, with all members of the team cooperating.

A conference with the nursing teams is held at the end of the schedule, with all members participating. Interesting points of specific operations are related to the group, and a discussion follows. The schedule for the following day is discussed, and assignments are made. Team members do not remain the same. They are given an opportunity to scrub or circulate on all services. During the conference the operating room supervisor brings important changes to the attention of the group. If necessary, demonstrations are given. All participants are encouraged to ask questions and make suggestions. After the conference nurses and technical aides select instruments and stock the rooms to which they are assigned for the next day. If time does not permit a full conference, the assignments are made and the discussion is held for the next conference period.

Q. I am an operating room supervisor who is contemplating a trip to New York. I would like to visit the operating rooms in several hospitals. Is this usually permitted? Should I write for permission or could I make arrangements after I arrive in the city?

A. Registered nurses are generally permitted to visit the various hospital departments after presenting their state registration card in the nursing office. If you wish to visit the operating room, a telephone call to the nursing office should precede your visit. If you desire to obtain information which will involve the time of a supervisor or instructor it is best to write for an appointment. Most of our hospitals welcome professional visitors.

Surgeon Sees His Duty in Aseptic Technic

● *The following letter, reprinted here because it expresses such a clear understanding of the surgeon's responsibility in enforcing aseptic technic, appeared in* Annals of Surgery, *139:256, February, 1954, and is reprinted by permission of the author and the publisher, J. B. Lippincott Co. It contains minor revisions made by the author following the original publication. Dr. Prioleau is clinical professor of surgery, Medical College of the State of South Carolina, Charleston.*

Editor, Annals of Surgery

Dear Sir:

In observing operations in various hospitals, one cannot help but note how commonly breaches in aseptic technic are passed over apparently unnoticed.

The blame for this must be placed upon the surgeon who is performing the individual operation. While the supervising nurse is charged with the enforcement of aseptic technic, she cannot carry this out effectively without the support of the surgeon, especially in regard to physicians and ancillary personnel.

Adherence to the generally accepted principles of surgical technic is of more than local significance due to the present day frequent exchanges of hospital personnel. For instance, it creates an awkward situation to have a nurse anesthetist, wearing a distinctive cap, resent a request to cover adequately her scalp hair on the ground that it was not required by a prominent surgeon with whom she recently worked.

The resident surgeon, when operating upon cases assigned to him, finds it difficult as well as embarrassing to make technical points which are overlooked by the attending surgeon. It is particularly difficult to explain such inconsistencies to observant and critical students. The fact that the surgeon has to give thought to problems connected with the particular operation does not relieve him of an over-all responsibility.

Maintenance of aseptic technic is chiefly dependent upon a state of mind and conscience, and should not require undue extra effort on his part. It is not logical for the

hospital to go to heavy expense in providing sterilized goods, expensive equipment and highly trained personnel only to have the efforts vitiated by the surgeons overlooking obvious breaks in technic.

Among the more common of these breaches in sterile precautions are permitting improperly garbed consultants to enter the operating room, ineffective masking, inadequate covering of the scalp hair of the operating personnel, contamination of freshly scrubbed hands and forearms by dripping sleeves and bulging shirt fronts, and contamination of sources of supply by using lifting forceps from the instrument table during an operation.

Enforcement of aseptic technic is made difficult by the fact that infections, when they do occur, do not manifest themselves for several days, and then may not be connected with the causative error. In many instances their occurrence is not made known to the operating room personnel unless the surgeon himself sees to it. To add to the difficulties of the supervising nurse, surgeons in some specialties demand more rigid requirements than in others, though there are exceptions in all groups.

The observance of aseptic technic should be considered a responsibility of the surgeon, which can be delegated only in part. It is effected by constant vigilance accompanied by tactful correction of errors at the time of their occurrence, or in a few situations, very soon thereafter. Only by assuming his proper role in this respect can the surgeon reduce the incidence of infection to a minimum. This is an obligation not only to himself, but to the surgical profession.

Sincerely,

William H. Prioleau, M.D.
Charleston, S. C.

L. to r., at A.O.R.N. meeting: T. J. Cronin, purchasing agent, Methodist Hospital, Brooklyn; Mary Vaneschak, O.R. staff, Josephine Harvey, scrub nurse, and Clare Pawlowicz, O.R. staff, all of Perth Amboy (N. J.) General Hospital; Fred K. Fish, director, Lutheran Hospital, Brooklyn; and William F. Moore, assistant director, The Brooklyn Hospital.

around the A.O.R.N. map

SALEM

One of the newest groups to organize was the Salem (Ore.) A.O.R.N. Members of the group, shown above in their first official photograph are front row, l. to r.: Jane Farnsworth, Kathryn Gillenwater, Laura Ferguson, and Joyce Thompson. Back row, l. to r.: Frances Donaldson, Frances Aleshire, Marjorie Swanson, Joy Barber, Charity Kropf, Gladys Renshaw, Mae Johnston, Lillian Bloch, and Bertha Wichman.

Organization of the group resulted from the efforts of two individuals from Salem Memorial Hospital. Pictured above center, they are: I. F. Wedel, administrator, and Frances Donaldson, operating room supervisor.

Right, official duties will be carried on by (l. to r.) Laura Ferguson, program chairman; Jane Farnsworth, president, and Frances Donaldson, secretary.

● Operating room nurses from hospitals in the California counties of Sutter, Yuba, Sacramento, Placer, and San Joaquin have organized a Sacramento A.O.R.N. At a meeting in Sacramento, Jean Mitchell, Sutter Hospital, was elected temporary chairman. Other officers are Waverly Young, Sacramento County Hospital, secretary, and Mrs. Lucille Stephens, Mercy Hospital, treasurer.

Members of the group pictured above are, seated, l. to r.: Bessie Lindsay, St. Joseph's Hospital, Stockton; Edna Reiswig, Lodi Memorial Hospital, Lodi; Hazel O'Connell, Sutter Maternity Hospital; Dorothy Mettler, Lodi Memorial Hospital; A. Van Konynenburg, Dameron Hospital, Stockton, and Florence Bennetts, Mercy Hospital.

Standing, l. to r., are: Dorothy McEneny, St. Joseph's Hospital, Stockton; Audrey Moser, Roseville Community Hospital, Roseville; Ruth Gimbel, Buchanan Hospital, Lodi; Margaret Kish, Roseville Community Hospital; Jean Mitchell; Dorothy Mae Rohrer, Dameron Hospital, Stockton; Ethel Hall, Sutter Hospital; Thelma L. Sheets, Mercy Children's Hospital; Waverly L. Young; Lorraine Tinker, Sacramento County Hospital; Sylvia M. Beers, Rideout Memorial Hospital, Marysville; Margaret Coffer, Sutter County Hospital, Yuba City; Margery Igo, Yuba City Community Hospital, Yuba City; Zueletta Bellani, Sacramento County Hospital; Lisbeth Brandt, Sutter County Hospital, Yuba City, and Mrs Lucille Stephens.

• The Central Coast Counties A.O.R.N. has been organized by operating room nurses from San Mateo, Santa Clara, Santa Cruz, and Monterey counties in California. Officers of the group are Mrs. Ida Conner, Santa Clara County Hospital, temporary chairman, and Mrs. Muriel Walker, Doctor's Hospital, treasurer.

Members are, seated l. to r.: Patricia McCarthy and Jean Bracchi, O'Connors Hospital, San Jose; Donna De Brito, Coralee Steele, and Armistine Salmina, all of Salinas Valley Memorial Hospital, Salinas; Fern Cluever, San Jose Hospital, San Jose; Muriel Walker; Mildred Lurbe, Agnew State Hospital, Agnew; Charlotte Buron, Park Lane Hospital, Salinas, and Edna Hunter, Dominican Santa Cruz Hospital, Santa Cruz.

Standing, l. to r.: Danitza Medigovich, Sequoia Hospital, Redwood City; Janet Lewis, Peninsula Community Hospital, Burlingame; Dorothy Spilman, Watsonville Hospital, Watsonville; Kathryn Rusconi, O'Connors Hospital, San Jose; Irene Rino, Watsonville Hospital; Alice Pelletaire and Ida Conner, Santa Clara Hospital, San Jose; Florence Ford, Mills Memorial Hospital, San Mateo; Violet Toerner and Mary Baker, Agnew State Hospital, Agnew; Annabel Kirkley, Mary Ericksen, and Alba Duncan, Vallejo General Hospital, Vallejo; Vonnie Beatie, Dominican Santa Cruz Hospital, and Julia Leslie and Marjorie Murray, Peninsula Community Hospital, Carmel.

Members of the recently organized Temple, Tex., Association of Operating Room Nurses are, front row, (l. to r.): Jennie Aagenas, VA Hospital, Temple; Mrs. Mary Thompson, Scott and White Memorial Hospital, Temple; Mrs. Shirley Christopher, VA Hospital; and Helen Hommel and Mrs. Elizabeth Fowler, both of Scott and White Memorial Hospital. Back row: Mrs. Virginia Hurta, Ruby Prather, Mrs. Ruth Tyroch, Mrs. Mable Hall, and Mrs. Nell Rose Moore, all of VA Hospital; and Mrs. Ruby Kuschke, Santa Fe Hospital, Temple.

THE A.O.R.N. of Southern New Hampshire met as an official organization in January. The group includes nurses from five Manchester hospitals: Sacred Heart Hospital, Notre Dame Hospital, Elliot Hospital, Moore Hospital, and Veterans Hospital. Also included are the St. Joseph's Hospital and Memorial Hospital, Nashua, and Margaret Pillsbury Hospital and Concord State Hospital, Concord. Meetings are held monthly at the various hospitals. First officers of the group are: Ralph Card, Moore General Hospital, president; Martha Rigs, Memorial Hospital, vice president; Rita Perry, Margaret Pillsbury Hospital, treasurer; and Alice Lamere, Sacred Heart Hospital, secretary. Pictured standing l. to r. are: Olivette Provencher, Simone Parker, Helen Brouseau, Lorraine Rauhe, Barbara Cooper, Mrs. Hoitt, Ceilia Gleason, Marguerite Fitzgerald, Anne Lamere, and Patricia Arnotis. Seated: Margaret Knaub, Ralph Card, Sister Mary Joanna, Eleanor Dwyer, and Alice Lamere.

A.O.R.N. of Southern
New Hampshire

California Nurses Form A.O.R.N.

• Operating room nurses from Ventura, Santa Barbara, Oxnard, and Camarillo, Calif., met recently at Ventura to organize an Association of Operating Room Nurses for that area. Named president of the group was Mrs. D. Brazill, O.R.S., Ventura County Hospital. Monthly meetings are planned.

Shown in picture at left, taken at the meeting, are (Seated, l. to r.): Mrs. Brazill; R. Borell; E. Telson; M. Gonoman; E. Leggett; M. Watke; C. Sterling; M. Heagle; E. Greene; and M. Palmore.

Standing (first row, l. to r.): M. Mumper; L. Gary, O.R.S., Cottage Hospital, Santa Barbara; E. Castroe; A. George; D. Criswell; B. Sheridan; B. Basin; M. Drace; M. Boise, O.R.S., Santa Barbara County Hospital; and B. Cantor.

Standing (second row, l. to r.): M. Reuter, O.R.S., Camarillo State Hospital; M. Levesque; C. Reymond; A. Palmer; M. Milligan; J. Krenik; B. Bacon; M. Stone; T. Bennett, and L. Santiago.

New A.O.R.N. Group Organized by Worcester Nurses

• Operating room nurses in Worcester, Mass., have formed a new A.O.R.N. group (Unit Two, Massachusetts A.O.R.N.)

Officers of the organization are: Delores Weaver, Worcester Memorial Hospital, president; Beatrice Dupree, Fairlawn Hospital, vice-president; Doris Brennan, St. Vincent's Hospital, secretary; Geneva Lemerise, Worcester Memorial, treasurer; and Mrs. Barbara Dupsha, St. Vincent's, assistant secretary.

Members of the board of directors are Marjorie Szymcik, Henry Heywood Hospital; Doris Davis, Worcester Memorial; Rose Eknoion, Worcester City Hospital, and Mrs. Barbara Floyd, Worcester County Sanitarium.

Officers, photographed at a recent meeting, are (seated, l. to r.): Geneva Lemerise, Delores Weaver, and Doris Brennan.

Standing (l. to r.): Marjorie Szymcik; Doris Davis; Rose Eknoion; Beatrice Dupree; Mrs. Barbara Floyd, and Mrs. Barbara Dupsha.

The entire group is shown on opposite page.

O. R. news from Nebraska concerns a new Association of Operating Room Nurses formed recently at Lincoln. Officers and members pictured above are, first row (l. to r.): Charlotte Nalley, Lincoln General Hospital; Elizabethe Fry, Deaconess Hospital, Beatrice; Emma Parks, Ora Layman and Frances Bermaster, all of Lincoln State Hospital; and Sister Mary Gertrude, St. Elizabeth's Hospital, Lincoln.

Second row: Eleanore Boquet, Lincoln VA Hospital; Betty Lee, Lincoln General; Mary Hiatt, Lincoln VA; Martha Thimm, Beatrice, Nebr.; Jackie Nelson, St. Elizabeth's; Irene Kotas, Lincoln VA; Esther Kuykendall, Virginia D. Green and Rose B. Macias, all of Lincoln VA; Marilyn Bstandig and Norma Barfknicht, both of Lincoln General; and Sister Mary Odolina, St. Elizabeth's.

Third row: Ella Fischer, Grace Woodard, Mary Anne Pryor, and Jeanette Wittrock, all of Lincoln General; A. Hunter Harris, Bryan Memorial, Lincoln; and Donna Neuhofel, Lincoln General.

Tacoma Nurses Form A.O.R.N.

Members of the new A.O.R.N. group formed recently in Tacoma, Wash., are, front row, l. to r.: Mrs. Benedict, Mrs. L. McDonald, Mrs. Branhall, Mrs. Gibson Dunn, Mrs. Frances Olmstead, Mrs. Helen Brant, and Edna Larson.

Second row: Mrs. Johnson, Mrs. Jamison, E. Callahan, Mrs. Dorothy Nicols, Leola Simmons, Mrs. Duley, and Mrs. Bean.

Third row: Miss Cole, Mrs. Glastetter, Mrs. Barlindal, Agnes Vimmerstedt, Mrs. Leech, Sister Sylvina, Margaret Leitch, and Mrs. Compeau. Sister Sylvina, operating room supervisor, St. Joseph's Hospital, Tacoma, is president of the group.

Third Massachusetts Unit Formed

OPERATING room nurses in western Massachusetts recently formed Unit III, Massachusetts A.O.R.N. Officers of the group, shown at their first meeting at the Pittsfield General Hospital, are (seated, l. to r.): Ellen Cuske, Holyoke Soldiers' Home, secretary; Marie Bradway, Pittsfield General Hospital, president; Katherine Vachula, Cooley Dickinson Hospital, vice-president; and Pauline Driscoll, Wesson Memorial Hospital, treasurer. Standing (l. to r.): Rosalie Pukish, Wesson Memorial Hospital, board of directors; Helen Kelley, Holyoke Soldiers' Home, assistant secretary; and Louise Sessler, Franklin County Public Hospital, board of directors. (Picture of entire group below.)

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